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REPORT OF THE ERUPTION OF KATMAI VOLCANO*

Thursday, June 6th, was a clear frosty morning in Seldovia. Until about 3 P.M. the sky was cloudless and the air clear, the mountains across the Inlet showing plainly. There was no steam visible from Iliamna or Redoubt Mts.

During the forenoon, low deep reports as of distant blasting were heard and some people even then believed them to be volcanic. As the day passed the reports came oftener and louder, and next morning, Friday, June 7th, there was a slight fall of volcanic ash. The sky was overcast with peculiarly colored clouds and the explosions continued all day.

The morning of Saturday, June 8th, was much darker than usual, with a light S.W. breeze. At 6:10 A.M. the sky except near the northern horizon was overcast with one dull-colored cloud, under which were a few masses of mountain fog, tinted to a sickly yellow by the yellow light. The darkness increased and at 7:10 A.M. a fine dust began falling. Lights were necessary in the *Yukon* wardroom for two hours. The ash-fall gradually slackened and was over by 10 A.M. when about half an inch had fallen. The fine grit sifted everywhere like hard frozen snow and was hard on eyes and throat.

About 6 P.M. the S.S. *Dora* came into port with nearly a foot of coarser, darker dust on her decks. The *Dora* reported that when in Shelikof Strait they had seen a dense cloud rising from Katmai Volcano;† the cloud gained slowly all through Kupreanof Strait and overtook the ship when approaching Kodiak. Unable to make the

*This report by Mr. I. M. Dailey, Assistant, Coast and Geodetic Survey, is printed in the *Bulletin* by courtesy of the Survey. It is dated at Port Graham, Alaska, June 20, 1912, and describes what Mr. Dailey observed during the eruption of the Katmai Volcano. Port Graham is about 140 statute miles in a northeasterly direction from Katmai Volcano and Seldovia is about fifteen miles further in the same direction. The two photographs show the depth of ash falling on Kodiak Island during the eruption.

†Katmai Volcano is about 60 statute miles, across Shelikof Strait, from the nearest point in Kodiak Island, and 140 miles from the town of Kodiak.

XUM

harbor, the *Dora* stood out to sea for fifteen hours of dust and darkness before coming to natural light.

During the evening the western sky was partly clear with long trails of rust-colored ashes or smoke stretching across toward the north from the dense southern sky. As the sun neared the horizon the trails changed to a dark red color which I had never seen in sunset sky before.

About 3 A.M. on Sunday, the 9th, a thick cloud slowly shut down

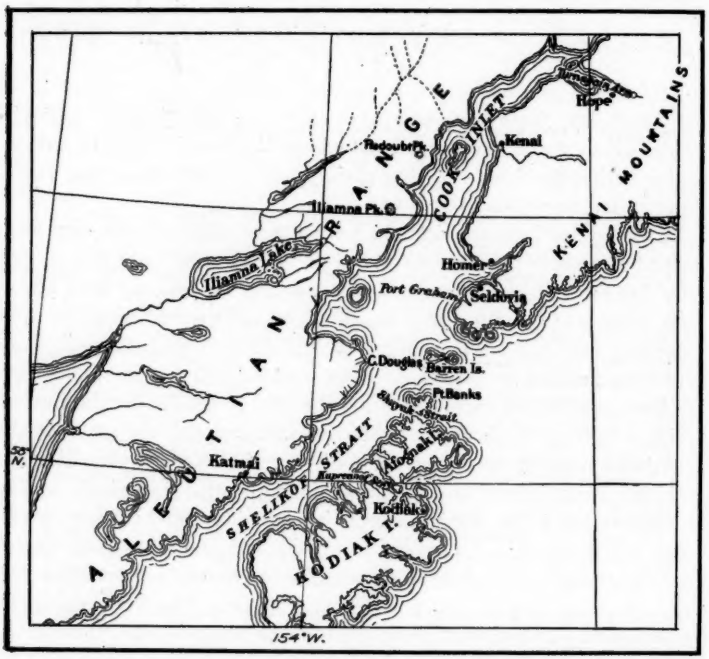

FIG. 1—Katmai and neighboring parts of Alaska.

from the south, and until after 5 A.M. there was inky darkness with a fall of ashes which, in lessening quantities, continued until nearly noon, when about three-quarters of an inch had fallen. All day Sunday was overcast and foggy, the air and land looking like a quiet, snowy day in the States. The explosions continued at irregular intervals all Sunday and Monday, but we did not hear any on Tuesday. There was no ordinary thunder at Seldovia, and no lightning, though boats on the Inlet on Friday night reported lightning rising

from the water in the direction of the Barren Islands and natives from a fishing camp near Homer brought word that Mt. Douglas was throwing fire. The Seldovia dust was fine and light, and days after its fall the hill breezes carried it upward from the spruce, giving the impression of a forest fire.

Word was brought to Seldovia that Kodiak needed help and the *Yukon* arrived there on Sunday, June 16th. The town that was so fresh and green last Spring looked gray and desolate. The level gardens and potato patches were covered about eighteen inches deep. It was probably much deeper when it first fell, and judging from the trodden paths, will finally settle down to six or eight inches. In

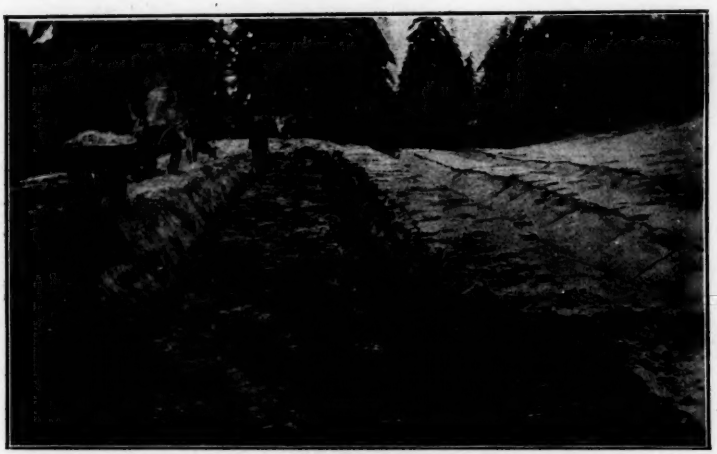

FIG. 2—After two weeks settling and packing by hard rains, the volcanic ash measured 10½ inches deep. Note three strata.

narrow valleys and at the foot of hills the dust was several feet deep. There had been light rain and the trees were weighted with white mud which looked like snow.

The people had shoveled paths from their doors and some of the more energetic had cleared their little gardens. Many cattle had been butchered to save them from starving, but green grass is appearing on the steeper hillsides and the cattle that were spared will be able to pick up a living. Wild land creatures are hungry; ravens were chasing parkie squirrels and even trying to kill young lambs. The lower strata or first fall was sand; and above this were the pink and white dusts as at Seldovia.

XUM

Kodiak people report sixty hours of darkness, with earthquakes, thunder, lightning and suffocating dust. Those who ventured out of doors wrapped wet towels about their heads. Most of the population took refuge aboard the revenue cutter *Manning*, whose officers report that in spite of four lines of hose playing and as many men as there was room for shoveling, they were barely able to keep the ashes from accumulating on deck. Owing to the location of the Kodiak wharf and wharf houses, vessels there got more than the fall in the open. The ashes at Seldovia and at Kodiak fell in a calm, but at Black Cape, where the *Yukon* anchored on account of rough weather, they had been driven with some force against the tree trunks and had adhered, making a sharp angle on the windward side.

FIG. 3—Trees in front of the Mission covered with volcanic ash.

At Kodiak the lightning was described as moving slowly across the sky from the northward, like masses of fire dimly seen through the dust. The wireless telegraph house at the Wood Island station was burned. The rancher at Onion Bay reported lightning of similar character.

Westward of Shyuak Strait there were belts and patches of white water, caused by floating particles of pumice. Fishermen agree in saying that the salmon run in Shelikof Strait has practically stopped and the natives whose living almost depends on the salmon are wondering if they will come again when the water clears.

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THE MISSISSIPPI RIVER FLOOD OF 1912

BY

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Floods in rivers are annual occurrences. They are the result to a large degree of the changing seasons following the annual migration of the planetary wind belts. Floods in any one stream, however, vary in many ways, notably in height, in duration and in the time of the high stage season, during which they are dominant. It is necessary to realize in the first place, in discussing the great flood of 1912 in the Mississippi River, that a flood is a normal event in the river, and then to search for the variable features which have made a normal flood excessive.

As the Mississippi River drains a vast area and the headwaters of its tributary streams are in widely separated portions of the country, no one single flood, as a rule, passes down the trunk stream, but a series of flood waves which correspond to the spring rises in the different large tributaries. In consequence, the high stage of the river usually extends over a period of six months, from January to June inclusive. The Ohio, Missouri and the Upper Mississippi tributaries yield 63 per cent. of the total discharge of the river and are the prime factors to be considered. The Ohio district has its heaviest rainfall usually during January, February and March. Its large tributaries, the Cumberland and the Tennessee, rise in the southern Appalachians in a region of copious rainfall and add an enormous volume of water to the Ohio. The Ohio streams are in the track of the storms which come from the Gulf and although the entire basin of the Ohio River is less than one-half that of the Missouri, it furnishes over twice as much water to the Mississippi (of the 63 per cent., the Missouri contributes 14, the Ohio 31, and the Upper Mississippi 18).

The Missouri River basin has its rainfall in May and June and is the source of the late floods of the Mississippi. Although the Missouri has the largest drainage area of any of the tributaries, yet, because of the scant rainfall over the district and the small percentage of run-off due to an absorptive soil, it is hydrologically the least important. The upper Mississippi River has its heaviest rain-

XUM

fall in May and June also and its rise unites usually with that of the Missouri. The ordinary sequence of floods is first the Ohio, then the Upper Mississippi, followed by the Missouri with the western streams. It is a common statement but well worth repeating that these streams have never been known to be in excessive flood at the same time. Such a coincidence would produce a discharge of more than 3,000,000 cubic feet per second, twice as large as has ever been observed.

The variable features in the Mississippi River floods are:

1. The amount of rainfall. Excessive rains are the prominent cause of all great floods. The 1907 flood was due to heavy rains in the Cumberland-Tennessee districts during January. The 1903 flood was caused by excessive rains during early March and the 1912 flood was the result of a succession of heavy storms during the last of March and early April.

2. The condition of the ground as to moisture. The most obvious example of this would be a rainfall of two inches extending over three days, which may produce only a very slight rise in a river, while the same amount in two hours may produce a very great one. A number of storms in rather rapid succession would have the same effect in increasing the percentage of run-off and this circumstance was the experience last spring.

3. Condition of the ground, whether frozen or vegetation covered. The run-off of the 1907 flood was high because the rain came during January when the ground was frozen. In general the Ohio floods come before the frost is out of the ground, so that a heavy rainfall is almost surely followed by a full stream. The question of the effect of the vegetation cover is a mooted one. M. I. Leighton believes that an increase in flood tendency has been caused to a great degree by the denudation of forest areas. On the other hand, Smith says* with considerable confidence that the question of increasing flood conditions and increasing low-water periods is fairly settled in the negative, so far as the available stream flow data can settle it.

4. The height at which the flood finds the lower trunk. The 1903 flood was emptied into the lower Mississippi at a time when the lower tributaries, such as the St. Francis, White, Arkansas, Yazoo and the Red Rivers, were at an extensively high state. A similar condition existed during the 1897 flood, which made the gage readings of the lower Mississippi stations for these two floods higher

*J. Warren Smith. "The Relation between the Precipitation over the Watershed of the Ohio River above and the Stream-flow at Cincinnati." *Bull. 40, Weather Bureau, U. S. Dept. of Agric.*

than during any flood of the period 1882-1911. During the 1912 flood the lower river was at a high stage when the Ohio flood reached it and the gages of this flood were in excess of any which had been recorded.

5. The duration of the rise. The length of time which a flood is at or above the danger line determines in a measure the amount of territory that is threatened. A sudden rise up river flattens out as it proceeds down stream and thus a high stage of slight duration at Cairo may be insignificant when New Orleans is reached, while a series of rises up river tends to promote dangerous conditions in the lower river in counteracting the flattening tendency by additional volumes of water.

6. Local rainfall in the lower valley. Not only were the lower reaches of the Mississippi River in flood from the Missouri when the Ohio flood waters reached it, but the condition was aggravated this year by excessive rainfall, which in itself caused the towns of the lower valley to suffer because of the impossibility of draining off the surplus. New Orleans could not, for instance, take care of the rainfall when the high stages of the river were threatening the city with further disaster.

Conditions Causing the Flood of 1912.

The precipitation during January and February over the greater part of the basin of the Mississippi was much below the normal. At Topeka, for instance, the January normal is .93 inch., the departure last January was — .79 inch, making an actual total rainfall for the month of but .14 inch; at Bismarck, the figures read, normal .54 inch, departure this year from normal, — .34 inch, actual precipitation .20 inch; at St. Paul, normal .90 inch, departure last January, — .38 inch, precipitation .52 inch; at Pittsburg, January normal, 2.87 inches, departure this year, — .97, actual precipitation 1.90 inches; at Nashville, January normal is 4.85 inches, departure this year — 1.93 inches, actual precipitation 2.92 inches. The only area not reporting a deficiency for January was a belt extending from Memphis to Indianapolis (Fig. 1). The snowfall in southern Illinois was heavy and Cairo's departure from the normal for the month was + .31 inch (in snow), making a total precipitation for Cairo for the month of 4.13 inches. During February a slight increase over the normal fell at Topeka (normal for February 1.44 inches, departure this year + .14 inch, actual precipitation for the month 1.58 inches). Practically no rainfall was reported for Bismarck (normal for Feb-

XUM

ruary .52 inch, departure this year, — .42 inch, actual precipitation .10 inch), or for St. Paul (normal for February .87 inch, departure this year, — .80 inch, actual precipitation .07 inch); while Pittsburg (normal for February 2.75, departure this year, — .95, actual precipitation 1.80 inch) and Nashville (normal for February 4.46, departure this year, — .25, actual precipitation 4.21 inches) fell below the normal precipitation. The exception in the case of Topeka was caused by snowfall over Kansas and Nebraska. The snowfall on February 25th in Kansas was the heaviest since 1900, and the total monthly snowfall ranged from six to twenty-four inches. At the end of the month a considerable body of snow covered the ground

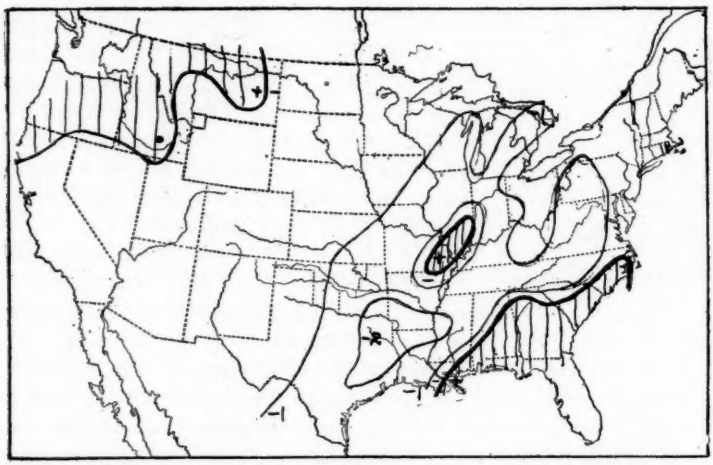

FIG. 1—Departures from Normal Precipitation for January. From No. 1—*National Weekly Weather Bulletin for 1912.* Heavy line mark the places of normal rainfall; shaded portions show excess (+); unshaded portions deficiency (−); light lines show amount of excess or deficiency, in inches.

from western Kansas to eastern Colorado, extending northeast to the Lake region (Fig. 2).

During March and April, except in the north, where the deficiency of precipitation continued, an abundant rainfall was reported. The flood conditions were inaugurated in the Missouri basin, with Missouri, Iowa, Kansas and Nebraska under the cover of excessive snow. Early March added to the amount of snow on the ground and in Nebraska the monthly snowfall (March) was the greatest for at least thirty years. With so deep a snow cover at the end of the season, it is natural to expect high stages in the rivers because of the

possibility of a rapid removal. Heavy rains and high temperatures during the middle of March melted the snow and caused unusually high stages on the lower Missouri, and this water caused a flood of moderate dimensions in the Mississippi. Following directly upon this, the excessive flood from the Ohio River came into the lower Mississippi.

In general, the rise of water from the Ohio begins early in January. In the 1907 flood the rise began as early as November 16, 1906. During 1912 the general deficiency of rain over most of the basin during January and February delayed the beginning of the Ohio flood. This flood is inaugurated by a southwest storm bringing

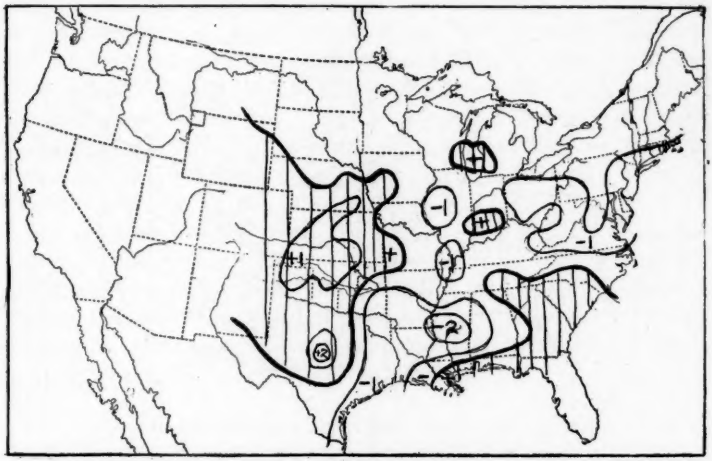

FIG. 2—Departures from Normal Precipitation for February. From *National Weekly Weather Bureau, No. 2, 1912.* Heavy line mark the places of normal rainfall; shaded portions show excess (+); unshaded portions deficiency (−); light lines show amount of excess or deficiency, in inches.

heavy rains and high temperatures. Because of heavy snow in the Missouri basin and slight precipitation in the Ohio, the ordinary sequence of floods was changed, and instead of Ohio, Missouri and Upper Mississippi, the order this year was, Missouri, Ohio and Upper Mississippi. It is worth while to note in passing that the same conditions which caused the Missouri flood did not exist over the Upper Mississippi area, but in figuring flood possibilities it behooves us to realize that they could have existed without any record breaking precipitation in the north. The unusually dry winter over all the northern part of the country was providential from the point of view of the flood stages in the lower river.

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The Ohio River began to rise after March 11, following the first of a series of southwest storms. This storm occurred on March 11-12 and it brought heavy precipitation throughout nearly the entire central and southern portions of the country. A second storm, March 14-15, moved over nearly the same course as the storm of March 11-12 and it was accompanied by heavy precipitation over most of the area. Following this storm the first warning was sent out on March 16, by the Weather Bureau. A third storm, March 20-21, was accompanied by moderate rains. At this time the Ohio River at Cairo had passed the 45-foot level. The entire Ohio was in flood, at Pittsburg the river was 6.1 feet above the flood stage. A

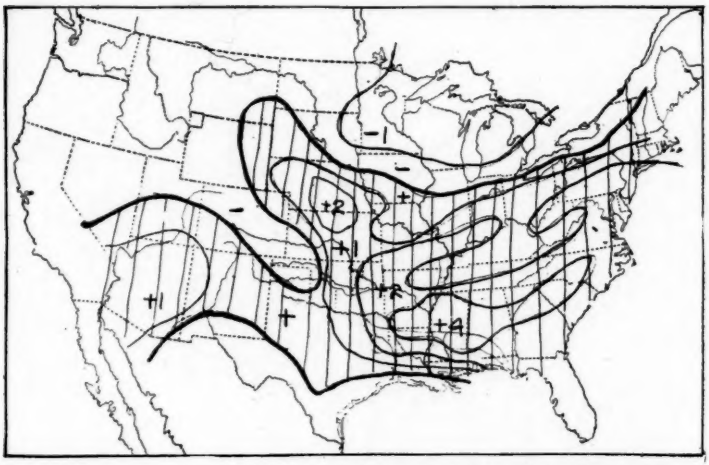

FIG. 3—Departures from Normal Precipitation for March. From No. 3—*National Weekly Weather Bulletin for 1912.* Heavy line mark the places of normal rainfall; shaded portions show excess (+); unshaded portions deficiency (–); light lines show amount of excess or deficiency, in inches.

fourth southwest storm set in on March 23-4 with unusually heavy precipitation and high temperatures, and a fifth on March 28-9 passed over the same area, again with heavy precipitation. At the end of the month, the highest stages of the river ever recorded were predicted between Cairo and Memphis; the water at Cairo was then at 51 feet, higher than during the 1903 and 1907 floods, and at Memphis, 38.1 or 3.1 feet above flood stage.

Altogether the precipitation for March was far above the normal. At Memphis with a normal for March of 5.77 inches, the departure for the month was + 3.76 inches, making a total monthly rainfall of 9.53 inches, and at Pittsburg the excess was 1.82 inch. The ex-

cesses for the month over the area drained by the river were from two to five inches. (Fig. 3.) The rainy condition continued into April. On April 1-2 another southwest storm brought heavy rains. This was, however, the last of the series of storms which brought unusual rains and which easily account for the stages of the Ohio. The rapid succession of the storms made the extreme stages continue longer than usual by supplying a fresh burden of water and made the flood condition in the lower reaches of the river hazardous. It was not until May that New Orleans began to suffer, and on May 9, Governor Saunders of Louisiana sent out his appeal to the Nation to protect his State from flood. After the middle of April, rains began to be excessive again and now the lower river received the brunt of the storms. For the week ending April 22, 1912, the precipitation ranged from four to eight inches above the normal over the lower parts of the Mississippi Valley. Mobile for the week reported a departure of + 10.53 inches with a normal of 1.07 inch. The rains continued into May, and at New Orleans the rainfall on April 30 was 1.2 inch, on May 6, 2.44 inches, May 7, 1.06 inch, May 10, .76 inch, and May 11, 6.94 inches.

In summing up the reasons for the excessive flood, it is evident that very heavy precipitation over the Lower Mississippi and the Ohio valleys was the prime reason. The lateness of the Ohio rise, however, allowed the Missouri flood which came from the melting of a heavy snow cover to reach the lower Mississippi almost simultaneously with the crest of the Ohio flood.

Some Conditions During the Flood of 1912.

The complete data of the 1912 flood have not been issued at the time of this writing, but enough has been published to give a good basis for comparison with the floods of other years. The 1912 flood at nearly every station on the Mississippi exceeded the highest gage reading since 1871, when river gages were first established along the river. Thus at Cairo, the record was 54.00 feet, the highest previous being 52.2 in 1883; at Memphis, 44.9, the highest previous being 40.3 in 1907; and at Helena, 54.2 as against 51.8, the highest previous in 1897. Frankenfield* is authority for the statement that the volume of water of the 1912 flood was greater than that of the 1907 or the 1903 floods but less than that of the 1897 flood, and he has arranged the floods in order of volume of water, beginning with the greatest, thus; 1897, 1912, 1903, 1907. At Cairo, the 1897

*H. C. Frankenfield. "The 1912 Floods in the Ohio and Mississippi Rivers." *Engineering News. Vol. 67, p. 747. Apr. 18, 1912.*

flood was above the flood stage (45 feet) 48 days, the 1912, between 40 and 45 days, the 1903, 25 days, and the 1907, 16 days.

The Mississippi River Commission has for a number of years adopted the policy of placing the grade of the levees at two feet above the estimated gage measurements of the highest flood. Thus for a while the provisional grade was two feet above the 1897 flood. Later the 1903 flood set a new mark and a grade two feet above the 1903 high water was made the limiting height of the levees. At Lake Providence, the 1903 water mark was two feet above the 1897; at Greenville, it was 2.4 feet above. Accordingly, the high water of 1903 reached to the top of the levees suggested after the 1897 flood and a new height two feet above the former estimated height was demanded. This latter height is about five feet above the provisional grade just before the 1903 flood. At Lake Providence and at Greenville these provisional grades have continued. The ultimate high water estimated by the Mississippi River Commission, based on the 1903 flood, was for Lake Providence 48 feet, and for Greenville 50.50 feet, which would place the levees at 50 and 52.50 feet respectively but in 1898 these were raised to 51 feet and 54.8 feet. The 1912 flood reached 48.25 at Lake Providence and 50.50 at Greenville, at almost the estimated figures. The loss of flood height due to the breaking of the levees and the release of water from within the levees is not considered. The estimated height will in all probability exceed the levee heights at these stations. At Cairo the highest previous record was in 1883 at 52.20, and the high water estimate was placed by the Commission at 54.17, which made the provisional grade 56.17 feet. The high water of 1912 reached to 54 feet at this station, and both Dabney and Frankenfield have estimated that the water would have reached the top of the provisional grade had not the levees in the locality given away and drained off a large volume of water. At Memphis, the water actually rose 3.3 feet above the Mississippi River Commission's estimate and overtopped the levees. The 1912 flood will cause the provisional grades for practically the whole reach of the river south of Cairo to be changed.

The efficiency of the levee system is the test of all the labor and the justification of the large expenditure. Efficiency may be measured in many ways. A comparison of the number of crevasses and the total number of miles of destroyed levees with the record of previous floods is the one in general use. During 1882, 284 crevasses were recorded and 59 miles of levee were destroyed. This record has been gradually improved. During 1890 only 23 crevasses were reported and 4.25 miles of levee were destroyed; during 1897, the

number of crevasses increased to 49, with a loss of 8.3 miles of levee; during the 1903 flood, 9 crevasses of importance were recorded and 5 of these caused a loss of 2.1 miles of levee; and during the 1907 flood, the breaks were practically negligible. The 1912 flood found a passage through 22 crevasses, which aggregated not far from 22 miles in length.

From the analysis of the overflow made out by Dabney,* the conditions of some of the larger crevasses were as follows:

1. Upper St. Francis Basin, State of Missouri. Two breaks aggregating 22,000 feet occurred in levees that had been built by the county districts. The districts were protected by sack topping on the levees which were 4.5 feet below the standard grade, and the water stood 1.5 feet above the top of the levees when the break occurred. Practically all of the district of 700 square miles was flooded.

2. The Hickman break in Kentucky. The levee was three feet below the standard grade and the height had been increased by sack topping. The water was one foot above the levee when the break occurred. The break was precipitated by a wind storm which caused a wash and the sack topping was undermined. All of the 310 square miles protected by this levee was inundated.

3. The Lower St. Francis, State of Arkansas. Three breaks which flooded 2,500 square miles of territory is the record here. At all of these stations the levee was from one to three feet below the standard grade and at two the water was above the levee at the time of the break.

4. Ten breaks in the Louisiana districts flooded about 2,800 square miles of territory. In practically all of these cases the water stood below the top of the levee at the time of the break. The reasons for the breaks are given as sandboils in two cases, cuts in two cases and one case each of sloughing on landside, enlargement, unstable substrata, crawfish holes, cut for roadway improperly filled and overtopping. There is no doubt that the breaks in the levees and the consequent discharge of the water from the high water channel made a lower stage for this flood at all places in the river from Cairo south.

Effects of the Flood.

The final estimate of the damage done by the 1912 flood cannot now be given, but certain approximations may be stated. Early in April, the Government estimated that the flood had already rendered

*A. L. Dabney. "The 1912 Flood on the Lower Mississippi." *Engineering News. Vol. 67, p. 1121. June 13, 1912.*

30,000 people homeless and caused a financial loss of $10,000,000, but this was before Louisiana had suffered the flood ravages. Early in May, the Governor of Louisiana sent out his appeal to the nation and in it he stated that in his territory 350,000 people had been affected by the flood. In the northern parishes out of 125,000 affected, the government was caring for 30,000 and in the southern parishes approximately a quarter of a million people were in some way affected, of whom at least 100,000 people would suffer loss and probably 40,000 people would eventually have to be cared for by the Government before they were able to get back to work again on their lands. The estimated damage by inundation is given at $6,000,000 and this will be increased considerably if the water does not drain from the cultivable areas in time for the planting. The same source announced that the total loss of life in Louisiana had not exceeded 20 and in all cases the cause was accidental, only indirectly due to the flood conditions. In general the efficiency of the Weather Bureau in issuing flood warnings is so high and the value of these warnings has been so ably demonstrated in other years, that the loss of life is now practically reduced to zero, although, as is to be expected, the stress due to unusual and especially portentious conditions increases the liability of accidents.

The territory inundated according to Dabney's analysis was practically all of the Upper St. Francis district on the west bank of the river in Missouri, about 700 square miles; 11 square miles of the Cairo drainage district in Illinois; all of the Reelfoot district, 310 square miles, on the east side of the river in Kentucky and Tennessee; 80 per cent., or about 2,500 square miles, of the Lower St. Francis district on the west side in Missouri and Arkansas; 80 per cent., or about 730 square miles, of the White river district on the west side in Arkansas; 50 per cent., or about 1,300 square miles, of the Lower Yazoo district on the east side in Mississippi, and some 3,000 square miles of the Louisiana districts on both sides of the river. Many towns suffered in one way or another and among the settlements wholly or partially inundated was Columbus, Mo., Hickman, Ky., and Memphis, Tenn.

Whenever a great flood passes down the Mississippi River, the possibility of a greater is at once apparent. And as the settlements on the flood plain are tending to increase, partly because of the protection during periods of minor floods given by the levees and partly because of the confidence invited by the Mississippi River Commission, the problem grows yearly more and more intricate. Yet just so far as this confidence is expressed in settlements within the area

liable to an overflow so much further must the levees protect beyond any chance of disaster. If we could count on compensating occurrences to arise at every bankfull stage, our levee system would be likely to be a safeguard against inundation, although the 1912 flood will, in a large measure, belie the contention. It is not to be expected that all the conditions favorable to floods should occur at once, but it is possible for them to do so, and the assertion is safe that unless the extreme volume of water which can be figured as a possibility in any Mississippi River flood can be cared for by the levee system alone, the public money should be turned to some more efficient means of protection. Just meeting the limit of strain or preventing a break only by excessive vigilance and energy or saving from disaster by some mitigating circumstance is not the end to be aimed at; but to be as reasonably sure as it is given man to be that an overflow cannot occur must be the plan. In many instances the limited area of rainfall has saved the levees; during 1903, the low stage of the river just before the flood was beneficial; during 1907, a cold wave came on and checked the rise in all the tributaries north of Cairo. The engineers of the first district labored with difficulty in almost continuous rains and prevented a break into the White River basin with great effort. Had not the weather turned cold on February 3d, they infer that in spite of their labors a break

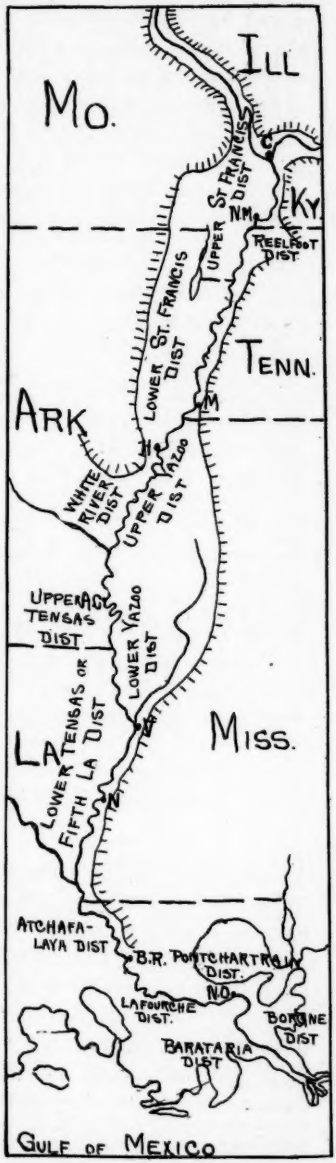

FIG. 4—Map of Lower Mississippi, showing locations of Levee Districts, and important points. C., Cairo; N. M., New Madrid; M., Memphis; H., Helena; A.C., Arkansas City; V., Vicksburg; N., Natchez; B.R., Baton Rouge; N. O., New Orleans.

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would have occurred. As it was, the levees were topped. The arrival of the cold wave prevented a greater flood and furthermore so checked the supply of water that the flood was of short duration in the upper portions of the alluvial basin. In 1912, the abnormally low amount of precipitation which fell in upper Mississippi drainage area, and therefore the lack of an extra volume of water from a source which rarely fails, opens a possibility for the levee advocates to consider seriously.

Tabulated Statements.

1. Extreme stages during recent floods on the Mississippi River for eleven stations.

Stations	High Water of the Year (in feet)					
	1882	*1897*	*1903*	*1907*	*1912*	Flood Stage
Cairo	51.87	51.67	50.60	50.30	54.00	45.00
Memphis	35.15	37.66	40.10	40.30	44.90	33.00
Helena	47.20	51.75	51.00	50.40	54.20	42.00
Arkansas City	47.10	51.90	52.90	52.10	55.40	42.00
Greenville	41.68	46.75	49.10	47.30	50.50	42.00
Lake Providence	38.32	44.54	46.48	46.30	48.25	42.00
Vicksburg	48.75	52.48	51.80	49.60	51.90	45.00
Natchez	47.75	49.82	50.35	48.90	51.40	...
Baton Rouge	35.95	40.65	40.05	37.40	43.80	....
New Orleans	15.80	19.50	20.30	19.80	21.40	16.00

The 1912 flood furnished record heights at all the stations in the above table, with the exception of Vicksburg, where the flood height fell below the previous highest stage of 1897.

2. The present condition of the levee system, from the last Annual Report of the Mississippi River Commission (Fig. 4).

Levee District	Miles in System	Percent. Now Built	Approx. Area in Sq. Miles Protected
Upper St. Francis	92.00	31.3	700
Lower St. Francis	212.00	82.5	3,500
White River	74.00	67.3	910
Reelfoot	21.00	64.2	310
Upper Yazoo	124.00	100.0	3,281
Lower Yazoo	207.60	82.3	3,367
Upper Tensas	192.90	81.0	2,500
Lower Tensas	157.54	81.9	2,080
Atchafalaya	127.22	87.2	6,085
Lafourche	82.23	85.5	.....
Barataria	71.88	73.3	2,020
Pontchartrain	125.78	87.6	.....
Lake Borgne	78.10	75.6	1,816
Total	1,565.25	81.7	26,569

The only district that was not inundated and the only levee reach which withstood the 1912 flood without a crevasse was the Upper Yazoo. This is the only levee district with completed levees.

3. Rainfall for January, February and March, 1912. From *The National Monthly Weather Bulletin, Weather Bureau* (in inches).

Stations	January		February		March	
	normal	departure	normal	departure	normal	departure
Vicksburg	5.67	—1.95	4.74	—2.04	6.25	+1.19
Little Rock	4.79	—1.25	4.34	—1.60	4.94	+4.11
Memphis	5.21	—1.80	4.49	—0.74	5.77	+3.76
Cincinnati	3.36	—1.15	3.33	—1.22	3.64	+1.09
Cairo	3.82	+0.31	3.44	—1.03	4.02	+1.27
St. Paul	0.90	—0.38	0.87	—0.80	1.60	—1.28
Lincoln, Neb.	0.62	—0.55	0.74	+0.57	1.33	+0.73
Wichita	0.77	—0.65	1.12	+1.20	2.25	+0.82

For the eight stations, the total departure for January was — 7.35 inches, for February, — 5.66 inches and for March, + 11.69 inches.

THE EXPEDITION OF THE ROYAL DANISH GEOGRAPHICAL SOCIETY TO ARABIA

PRELIMINARY REPORT

BY

BARCLAY RAUNKIÆR*
Copenhagen

On Nov. 12, 1911, I left Copenhagen for Constantinople, having been commissioned by the Royal Danish Geographical Society to make a reconnaissance journey in Northeastern Arabia. Through letters of introduction supplied by the Exploration Committee of that Society I received valuable support from the Turkish Government and from the Swedish-Danish representative, Minister v. Anckarsværd. I left Constantinople on Nov. 28 and crossed Asia Minor by the Anatolian and the completed portion of the Bagdad railroads. From Ulu-Kishla, which is the last station on the northern slopes of

* Mr. Raunkiær was known before this journey as a writer on the geography of plants and by his expedition to Central Tunis.

XUM

the Bulghar Dagh, I passed the Cilician Gates in three days, by carriage, went from Tarsus to the Mediterranean post of Mersine by rail and from Mersine to Alexandretta on a Russian steamer.

In Alexandretta the British Consul, Mr. Catoni, gave me useful letters of introduction to prominent persons in Haleb and Bagdad, and after a short stay, I proceeded to Haleb by carriage. I made my stay in the disagreeable winter climate of Haleb very short, and having in four days finished my preparations, I proceeded to Bagdad, for the most part following the western banks of the Euphrates. In the Euphrates Valley I made some investigations on agricultural problems such as had occupied me previously in Tunis. I spent Christmas Eve between Abu-Kemal and Ana and New Year's Eve in Ramadie, one of the last stations before Bagdad.

During my two weeks' stay in Bagdad I had much difficulty in finding an honest, English-speaking, Arab servant, but by help of the Swedish and French consuls I succeeded, and on Jan. 16, 1912, I started south on a "Lynch" steamer. In Basrah the Vali, his Excellence Hasan Risa Pasha, gave me a hearty welcome and supported my plans with the strongest interest and almost fatherly care.

After paying visits to the Russian Consul, Mr. Serge Tukholka, and to the American Mission, where I got some information about the country, I departed on Jan. 27 in a south-west direction to the little town of Zobeir. Here I stopped, as a protégé of the Vali, in the house of a rich Arab, Abdul Wahhab Mendil, and on the following day I proceeded with four pack horses on the two days' journey to Koweit. With the aid of my letters from the Turkish Government I was immediately received by Scheikh Mobarek and secured a room in his palace facing the sea. Here I lived for twenty-six days, occupied with difficult and patience-trying discussions concerning my further journey. At first, I was treated with very much distrust; but later, Mobarek, especially through the intervention of the British political agent, Captain Shakespear, was made to understand that I was quite neutral in regard to politics. Thereafter, the negotiations went on in a more friendly manner and concluded in the decision that my journey to Hofuf was to be made via Bereidah and Riadh in central Arabia.

Having been greatly assisted during my stay by Captain Shakespear and after being cured of a severe paroxysm of fever by the America medical missionary, Dr. Harrison, I left Koweit on February 24 with a merchant caravan of about 100 camels, bound for Nedjid. At that time the Emir of Hail was making war on the tribes in the Hadjara desert, and the direct Bereidah road along the

Wadi Rummah being too unsafe, it was decided to go by way of the well of Safah to Zilfi.

I had six camels and three Arabs with me. After nineteen days' journey through zones of clayey steppe, waste sandstone plateau and shifting sands, Zilfi was reached and two days later Bereidah. Here a murderous design against me was discovered at the last moment and the Emir himself, Fahad Ibn Ma'amr, received me in a very unamiable manner, starved me for two days and deprived me of my revolver and telescope, by a manœuvre easily seen through, the result of which was due to his power more than to his ability. He prevented my journey to Aneizeh and I was accordingly under the necessity of following Palgrave's route from Bereidah to Riadh via Zilfi and Medjma'a.

From Ghat, where another attempt on my life was made, the track mostly runs over the slightly elevated sandstone plateaus called Tuweik. From Bereidah to Riadh I traveled without caravan with my six camels and four men, having procured in Bereidah a man belonging to the Ima in Riadh. In spite of the fact that it was the task of this man to take me in safety to Riadh, the journey was nevertheless very adventuresome, for there were perils and among them an abundance of desert robbers. After a short stay in Riadh, where I was received with kindness and hospitality by the Imam Abderrahman Ibn Sa'ud, but, at the same time, held in close custody on account of the fanaticism of the people, I went on with a caravan, the main part of which was composed of about 150 pearl divers bound for Bahrein. These pearl divers were very insolent and hostile, and owing to the fact that the caravan did not carry any merchandise, they traveled very carelessly. The camp was pitched without the slightest caution, often in the most exposed places; no watch was kept during the night and it was due only to my own precautions that in the third night after Riadh, I was not assassinated by three Beni Murra Beduins.

After ten days' journey, following a track between Palgrave's and Pelly's routes, I arrived, on April 8, at Hofuf, where I was received with the most hearty welcome by the Turkish authorities. Being ill on account of drinking some very bad water on the way, I was anxious to reach the coast and I made my stay in Hofuf very short. Besides, I was still weak from some stomach trouble that had very much weakened me between Bereidah and Riadh. Having enjoyed the most grateful hospitality from the commandant, Abbas Hilmi Bey, I went on to Adjer, protected by an escort of fifty mounted Turkish soldiers. From Adjer I took an Arab sail-boat to Bahrein,

XUM

whence I departed, after a couple of days' rest in the house of the British political agent, Captain D. Lorimer. I returned to Denmark via Bombay-Triest and arrived in Copenhagen on Sunday, June 2.

I carried out my work in accordance with the plan of the Committee, which was that, apart from a few questions of Mesopotamian agriculture, the journey of geographical exploration should begin at Basrah. Regarding the journey from Basrah to Adjer, I, of course, gave special attention to drawing a route map, which I constructed with the aid of the rates of marching and prismatic compass (or dioptric compass) bearings, the use of more complicated instruments being impossible owing to the hostility of the population. Even with the compass I had difficulties, but nevertheless I succeeded during the whole journey in taking my bearings every fifteen minutes with the exception of a couple of days between Medjma'a and Riadh, where a severe illness compelled me to take my observations with longer intervals. Topographical description ran parallel with the map-drawing. I have gathered much information concerning political questions, the caravan trade, periodical wanderings of the nomads, etc.

On the other hand, I have not brought home any botanical collections, although I was prepared to do so; the distrust and fanaticism of the population were insurmountable obstacles. For the same reason it was exceedingly difficult to take photographs, but by using different expedients, I was able, nevertheless, to secure a considerable number of photographs and drawings from central and eastern Arabia. Besides these results (to be published during the winter 1912-13) come the results of the investigations that were the main object of the journey: to carry out a geographical reconnaissance the results of which might serve as a base for future expeditions of the Royal Danish Geographical Society in Arabia.

SOME DETAILS OF MR. STEFÀNSSON'S GEOGRAPHICAL WORK

Late in August, word came from Mr. V. Stefânsson and Dr. R. M. Anderson, his associate, by way of Point Barrow and Nome, that they were returning from their field of ethnological and geographical research in northern Alaska, Northern Canada, and the southwestern part of the Parry Archipelago. Mr. Stefânsson returned to New York in September.

The Society recently received a letter from Mr. Stefànsson dated "Mouth of the Kugaryuak River (18 miles east of the Coppermine R.), Coronation Gulf, April 24, 1911," in which he gives the following summary of the results of some of his discoveries, and outlines his plans for the traveling season of last year:

"The Coppermine River at various points, from fifty to seventy-five miles from the sea, has a width of no more than 135 or 140 yards. The average width is not much, if any, over 200 yards. The average width of Horton River, the same distance from the sea, is 350 to 400 yards, but the Coppermine is much the swifter stream and perhaps carries as much water as the Horton. In fact, the Coppermine is practically a continuous rapid for the lower seventy-five miles of its course, and broken ice is everywhere heaped in windrows. Ice cakes eleven or twelve inches thick and many square yards in area, in some cases, are piled into ridges in the manner of pressure ice on the unsheltered sea. Some of these ridges are fifteen to twenty feet high. Here and there are small stretches that have open water all winter. The current keeps them from freezing. The last open stretches in Horton River disappear in January. Compared with the Coppermine, the Horton is a good canoeing river—deep, free from rocks and with footing for "trackers" along its banks in most places.

"The most northerly trees (over five or six feet high) in the Coppermine Valley, as far as we know, are sixteen or eighteen miles from the sea; the most northerly sprigs of growing spruce are a mile and a half north of Bloody Fall, or less than six miles from the sea in an airline. To our surprise we found the other day a few small trees on the headwaters of the Kugaryuak, about twenty miles from the sea.

"The mouth of the Kugaryuak is about eighteen miles east of the most easterly mouth of the Coppermine. Its main branch comes from the southeast from an unknown distance. Its middle fork heads nearly south of the river's mouth about twenty miles inland. It is at the head of this branch that the trees are found. The Kugaryuak is about the size of the Dease or a trifle smaller.

"The ice in Coronation Gulf, west of Cape Barrow and south of the line of Cape Krusenstern, is in general level, though in some places there is a little rough ice even in apparently deep localities. On shoals there is, of course, pressure ice. The islands lie in regular chains—far more regular and far more numerous than our charts indicate. They vary from a fourth mile to five miles in length, but are of pretty uniform width—from a fourth to a half mile. The

gaps between the ends of the islands vary from a few yards to three or four miles. The islands are in general of exactly the type of the hilltops in the ridges on the mainland both west and south of Coronation Gulf, precipices to the south and southeast, a twenty per cent. dip to the northwest or north; with talus slopes to the south and low beaches to the north. The chains have a general east and west true direction. Typically, the islands are of columnar basalt, their tops strewn with large and small boulders of foreign rock. In a few places we have found limestone strata in the faces of precipices.

"On beaches there is usually driftwood; enough for a one-night camp can be picked up on a half-mile of beach. Wood is always found chiefly on the northwest side of land (no doubt because all high tides are with northwest winds), a stick lodged by any other wind would be so low that the next high tide (the next northwest wind tide) would wash it off again. There is open water all winter in the narrows of Dolphin and Union Strait, just east of Lambert Island, caused by a strong current which generally, if not always, flows to the westward out of Coronation Gulf. That it is sometimes reversed I infer from the finding of a large (Mackenzie River?) cottonwood log on an island thirty miles east of the Coppermine River. This current and the fact that high tides come with northwest winds only, cause the coast from Cape Krusenstern to Back Inlet to be devoid of driftwood. The same causes make driftwood comparatively plentiful along the mainland shore of Dolphin and Union Strait and practically absent from the Victoria Land shore of the same strait.

"Some of the people we recently visited near Cape Barrow are in the habit of hunting in summer south to the woods on Hanbury's Cirk-i-li-nik River. We should retain on our maps the native names of places. The official maps of the Canadian Government and the British Admiralty are of no value to us in making inquiries about distant places, while the unpretentious maps in Hanbury's book are priceless to us through designating certain places by their native names. If it had not been for his map we might have supposed the Cirk-i-li-nik to be some small stream only a hundred miles or two from Cape Barrow, whereas it rises near Slave Lake and flows into Chesterfield Inlet.

"We have found that the Coppermine is roughly a dividing line between different kinds of caribou. On the Dease and in the Bear Lake woods, as well as on the Horton River and down on Cape Parry and Cape Bathurst, is found a larger, dark-faced, dark-legged and generally dark-skinned caribou with clean-cut head reminding

one of the heads of horses; east of the Coppermine are light-haired, white-legged caribou, smaller, with short, donkey-like heads. This donkey-like appearance may be due partly to skeletal differences, but is probably caused chiefly by an abundant growth of hair on the face below the eyes. These white caribou are much easier to hunt than the darker ones. A few dark caribou are occasionally found east of the Coppermine R. among herds of light colored arrivals, and likewise a few light ones are found in herds of the darker caribou west of the river. Large herds of the lighter caribou are just now (and have been for two weeks) moving north across Coronation Gulf to Victoria Land.

"I have already written (*Bulletin, Amer. Geogr. Soc.*, 1911, Oct., pp. 771-775) of the possibility of finding evidence to show that some of Franklin's men survived for a time in Victoria Land. My work this spring had added nothing to the likelihood of this being discovered. The light beards, etc., become fewer and less pronounced as one goes east from the Coppermine towards Cape Barrow. We have been led to expect, however, that we shall find the European-like type stronger as we go north from the Cape Bexley people towards Walker Bay and beyond.

"For the present trip northward I have one companion, an Eskimo from Port Clarence, Alaska, called Natkusiak. We have one sled, six dogs, three rifles, 600 rounds of ammunition, some instruments, and provisions for two weeks. We expect to go up the west coast of Victoria Land as far north as it is inhabited, then cross to Banks Land, with those Eskimos who (we are told) hunt there in summer. If convenient we shall run up to the Bay of Mercy to see how everything is there. We then expect to spend the summer in Banks Land, perhaps going down to Cape Kellett in August on the chance of some whaler picking us up, for they often come near the Cape on their cruises for bowhead whales. If we do not see a ship, we shall try to reach Langton Bay by sled after Amundsen Gulf freezes—or rather, after the straits at the east end of the Gulf freeze—the Gulf itself probably never freezes permanently. As we go we shall buy a few of the more transportable, ethnological specimens we have a chance to get, make some small geological collections, and of course carry forward as best we can our routine work of investigation. We carry, too, a good supply of photo films."

XUM

THE SOCIETY'S TRANSCONTINENTAL EXCURSION

The European geographers, guests of the Society on the Transcontinental Excursion of 1912, began to arrive in New York about Aug. 12. They numbered, altogether, 43 persons, representing thirteen European countries and the leading geographical societies and universities. It is much regretted that Mr. Jules Leclercq, formerly President of the Royal Belgian Geographical Society, found it necessary to leave the Excursion at Chicago.

The names of our foreign guests, with their chief geographical positions, are given here. More extended allusion to them will appear in the account of the Excursion which will be printed after the return of the party:

AUSTRIA. Dr. Eduard Brückner, Professor of Geography at the University of Vienna; Dr. Fritz Machatschek, Privatdozent of Geography at the University of Vienna; Dr. Eugen Oberhummer, Professor of Geography at the University of Vienna.

BELGIUM. Paul Elsen, Member of the Royal Geographical Society of Antwerp.

DENMARK. Professor Ole Olufsen, Secretary of the Royal Danish Geographical Society.

FRANCE. Henri Baulig, Instructor in Geography, University of Paris; Albert Demangeon, Professor of Geography, University of Lille; Emmanuel de Margerie, Vice-President, Section of Historical and Descriptive Geography of the Comité des Travaux Historiques et Scientiques; Édouard Alfred Martel, late President, Commission Centrale de la Société de Géographie, Paris; Emmanuel de Martonne, Professor of Geography in the Universities of Lyons and Paris; Lucien Gallois, Professor of Geography, University of Paris; Antoine Vacher, Professor of Geography, University of Lille; Pierre Bastian, Student, University of Paris; Jacques Goubert, Student, University of Paris; François Herbette, Assistant in Geography, University of Paris.

GERMANY. Dr. Erich Von Drygalski, Professor of Geography, University of Munich; Dr. Fritz Jaeger, Professor of Colonial Geography, University of Berlin; Dr. Gottfried Merzbacher, Explorer; Dr. Joseph Partsch, Geheimrat, Professor of Geography, University of Leipzig; Dr. Alfred Rühl, Chief of Division, Oceanographical Institute, Berlin; Dr. Carl Uhlig, Professor of Geography, University of Tübingen; Harry Waldbaur, Student, University of Leipzig; Erich Wunderlich, Student, University of Berlin; Dr. Gustav W. Von Zahn, Geographical Institute, University of Jena.

GREAT BRITAIN. Henry O. Beckit, M.A., Balliol College, School of Geography, University of Oxford; George G. Chisholm, M.A., B.Sc. (Edin.), Lecturer on Geography, University of Edinburgh; Alan Grant Ogilvie, B.A., School of Geography, University of Oxford; Wm. H. Myles, M.A.

HUNGARY. Dr. Eugène de Cholnoky, Professor of Geography at the University of Kolozsvár; Count Paul Teleki, Dr. rer. polit., Honorary Secretary-General of the Hungarian Geographical Society.

ITALY. Dr. Olinto Marinelli, Professor of Geography at the Institute of Higher Studies, Florence; Professor G. Ricchieri, Milan, Professor of Geography at the R. Acad. Scientif. Letteraria; Dr. Cesare Calciati, Explorer.

THE NETHERLANDS. J. F. Niermeyer, Professor of Economic Geography, University of Utrecht; Dr. Karl Oestreich, Professor of Physical Geography, University of Utrecht.

NORWAY. Werner Werenskiold, Lecturer on Physical Geography, University of Christiania.

RUSSIA. Vladimir Doubiansky, Explorer, Conservator of the Imperial Botanical Gardens, St. Petersburg; Jules de Schokalsky, Professor of Physical Geography at the Académie Navale Nicolas and at the École Supérieure Pédagogique.

SWEDEN. Dr. Gunnar Andersson, Professor of Economic Geography at the College of Commerce, University of Stockholm.

SWITZERLAND. Émile Chaix, Professor of Economical and Political Geography at the University of Geneva and at the School of Commerce. Dr. Fritz Nussbaum, Instructor in Geography, University of Bern; André Chaix, Student, University of Geneva.

The American members of the Excursion number over sixty, only ten or twelve of whom are expected to be with the party for the entire trip. A list of the American members will be printed later.

The week before the excursion started west, on Aug. 22, was a busy, enjoyable and profitable time for the Society's guests. Through the courtesy of Columbia University, facilities for lodging the members were provided in Livingstone Hall. The House Committees of the University, Union League, Century and Harvard Clubs, and the President and Trustees of the American Museum of Natural History, kindly offered to the foreign members cards of temporary membership in those associations, during their stay in New York before the departure of the party.

A number of excursions under expert guidance gave the visitors much enjoyment. Prof. R. E. Dodge of Teachers College, Columbia University conducted a party on Aug. 15 to Washington, Conn., giving its members an opportunity to see the peneplain of southern New England and the activities of a dairying community.

XUM

On Aug. 16, Prof. Isaiah Bowman of Yale University took a party into Long Island as far as Far Rockaway, calling attention to the sharply defined southern border of the terminal moraine, the sand dunes and current action at Far Rockaway, other topographical and geological features, the market gardens near Mineola, etc.

On August 19 a party went to New Haven, where they were the guests of the Graduates' Club of Yale University at luncheon and later visited sedimentary beds, trap sheets, and other structural features, and observed the topographical aspects of the Connecticut Valley, under the leadership of Prof. Bowman.

A large party, under the guidance of H. B. Kümmel, State Geologist of New Jersey, and Richard R. Hice, State Geologist of Pennsylvania, on Aug. 19-20, visited an anthracite coal field of Pennsylvania. Stops were made at the Delaware Water Gap, Mt. Pocono and Scranton, where the party spent the night. At Scranton, the Board of Trade provided automobiles and the visitors inspected the surface workings of some of the coal mines. The principal geographical features seen on this excursion were portions of the terminal moraine of the last great ice sheet, the Triassic lowland, the maturely dissected, crystalline Highlands, a part of the Appalachian Valley, the Appalachian Plateau, and one of the anthracite coal basins.

On Aug. 21, all the foreign and many of the American members visited some of the most conspicuous downtown buildings in New York City, under the guidance of Dr. George F. Kunz. A complimentary lunch was served at the Whitehall Club, the observatory of the Weather Bureau on top of the Whitehall building was visited and some hours were devoted to a cruise through the harbor on a special boat.

A pleasant event of the week was a lawn party in honor of the foreign members at the residence of Mrs. Henry Villard, Dobbs Ferry-on-Hudson, on Sunday, Aug. 18. Dr. George F. Kunz conducted the party in a private car to Dobbs Ferry and the hostess and her friends made the occasion very enjoyable.

The excursion train left the Grand Central Terminal at 8.45 A. M. on Thursday, Aug. 22. The train consists of a baggage car, dining car, and four sleeping cars, containing about 90 berths in the sleeping sections, and 30 chairs in the observation parlors. As a rule, the excursion party numbers from sixty to seventy members. In the forward observation parlor is a library, the largest contributions to which are from the Director of the Geological Survey, including Survey Reports relating to the route, topographical maps

of the route as far as published and the twenty-three geological folios crossed by the route. Other library material is provided, including reports and articles, by American geographers and geologists or obtained from other sources.

A *Daily Bulletin,* containing the announcements and information of the day, is printed on the train. One of the most helpful features of the equipment is the "Guide Book for the Transcontinental Excursion of 1912," compiled by Prof. William Morris Davis. It is a little volume of 144 pp. issued in handsome and convenient form, with illustrations, by Messrs. Ginn & Co. of Boston, and their gift to the Excursion. It presents a concise, explanatory account of the larger physiographic provinces of the United States traversed by the Excursion and a more detailed statement of the local features seen along the route. A number of the specialists whose studies are cited or who have directly contributed to the preparation of the Guide Book are members of the Excursion for longer or shorter periods.

The staff of the Excursion is composed of the following gentlemen:

W. M. Davis, Director; Mark Jefferson, R. E. Dodge, I. Bowman, Marshalls; A. P. Brigham, Historian; Frank S. Churchill, M.D., Physician; N. M. Fenneman, Journalist; Lawrence Martin, Editor of *Daily Bulletin;* F. E. Williams, Librarian; W. L. G. Joerg, Assistant to the Director; Eugene D. Hussey, Excursion Conductor; Emmons J. Whitcomb, Assistant representing the Raymond-Whitcomb Co., Excursion Agents.

The following condensed itinerary will give a general idea of the route:

Aug. 22-23, New York, Albany, Utica, Syracuse, Ithaca, Rochester, ascending Mt. Beacon near Fishkill, with excursion to the Green Lakes from Syracuse; Aug. 24-25, Lockport, Buffalo, visiting the Lackawanna Steel Works, Niagara Falls, where over a day is spent; Aug. 26-27, Cleveland, Toledo, steamer to Detroit, Chicago, where a day is spent as guests of the Geographic Society of Chicago; Aug. 28-Sept. 2, Madison, Wis., with visit to the State University and automobile trip to the Driftless Area, Lake Pepin, St. Paul and Minneapolis, with local excursions as guests of the Twin Cities; Duluth, with local excursions, Fargo, Bismarck, Medora, with wagon-trip in the Badlands; Sept. 3-9, in Yellowstone National Park; Sept. 10-17, Bozeman, Butte, Spokane, local excursions in the Grand Coulée, Yakima Valley, with visits to irrigated fruit orchards, Seattle with local excursions, Tacoma, pass Portland in the night, the Dalles, return to Portland, Medford, automobile trip to Crater Lake, a day at Crater Lake; Sept. 18-27, Crater Lake to Klamath Falls by automobile, pass Mt. Shasta, three days in San Francisco with excursions to Mt. Tamalpais and the University of California at Berkeley, across the Sierras, two days in Salt Lake City, with excursions, Grand Junction with visit to irrigated fruit farms, Colorado Springs, a day in Denver; Sept. 28-Oct. 7, Parkdale, pass through the Royal Gorge, Pueblo, Raton, Santa Fé, petrified forest, two days at

XUM

the Grand Canyon of the Colorado, Phœnix, with automobile trip to the Roosevelt Dam, Ash Fork, eastern Colorado and Kansas, Kansas City; Oct. 8-16, St. Louis, leaving in the night for Memphis, boat excursion to Helena, by rail to Birmingham, Chattanooga with ascent of Lookout Mountain, Asheville, Charlottesville, visiting the University of Virginia, four days in Washington, with excursion to the Great Falls of the Potomac as guests of the National Geographic Society, visits to scientific bureaus, institutions, etc.; Oct. 17, arrive in New York in the morning, meeting in the afternoon, reception in the evening; Oct. 18, meeting in the afternoon, dinner in the evening.

At various points along the route the excursionists are the guests of Boards of Trade or other public bodies, at dinners, receptions and excursions. Most of the European visitors will leave New York for home on the steamships of Saturday Oct. 19.

THE 1910 CENSUS OF THE POPULATION OF CHINA

BY

W. W. ROCKHILL*

The problem of the population of the world is still far from being reliably solved, and the determination of the approximate population of China is such an important factor in this problem that we must welcome the appearance of the first official Chinese attempt at a real enumeration of the population of the Empire, the results of which were published in February, 1911, in the Government *Gazette,* or *Chêng-chih-kuan-pao,* of Peking. This document, though showing complete ignorance of the methods now nearly universally followed in vital statistical reports, throws considerable light on the question of China's population, and seems entitled to more confidence than the enumerations which have heretofore appeared.

In 1908, when the Empress Dowager Tzu'u-hsi took the momentous step of promising the people a representative government, the need of a census became at once felt as it probably never had been before. When the Government decided upon convening Provincial Deliberative Assemblies it was found necessary to state in the Regulations governing the subject and approved by the Throne on July 22, 1908, that "the representation in the Provincial Deliberative

* Reprinted from *T'oung Pao*, Vol. 13, 1912, No. 1, pp. 117-125, Leyden.

Assemblies would best of all be arranged on a strict basis of population, but as China has not yet made a census and to begin making one now would consume too much time, the statistics of the literary examinations and the tax rolls have been taken as a basis for reckoning the number of Assembly members to assign to each province."

The necessity of making a census remained, however, of vital importance; the above makeshift could not be tolerated for long. In an Imperial Edict of Aug. 27, 1908, which laid down a detailed programme of measures to be carried through as indispensable prerequisites to the proclaiming of the promised Constitution in 1917, it was prescribed that in 1909 the Ministry of the Interior, with the assistance of Viceroys and Governors, was to begin taking a census by households (as had heretofore been done), and report the results to Peking in 1910. In 1911 a further census (by heads) was to be made and reported to the Government in 1912.

On the 27th February, 1911, the Ministry of the Interior reported to the Throne the first results, which were not as complete as it had been hoped they would be, for certain returns had not yet reached Peking at the time the report was made. This enumeration is the basis of the present enquiry.

The report is divided into two parts: in the first the population by "households," of which it distinguishes two kinds, "principal households" and "sub-tenant households,"* is given not only for each "whole province" separately, but in the case of certain organizations, such as the Banner Corps, the Metropolitan District (Shun-t'ien-fu), the city of Peking, and the Manchu garrisons in various cities of the Empire, the number of families composing them is also given. The second and more fragmentary part of the report on the population is evidently the early returns of the second census to be made in 1912, and complementary to that by households. It is to give (1) the number of the population by heads of adults, (2) of school children (6 to 16 years of age), and (3) of "able-bodied men," fit for military service (probably from 16 to 45 years of age), for the same divisions as used in the first part of the report. Although this second part is but a fragment, it enables us to establish the approximate numeric value of the average household (for we cannot ascertain the exact difference between a *chêng* and a *fu* household, though the latter must unquestionably be smaller than the former) in a number of provinces and localities scattered over

* The only Chinese census prior to that of 1910, in which households are divided into two classes, *chêng hu* and *fu hu*, is that made by order of the Ministry of the Interior of the population of Peking, and published in the *Chên-chih-kuan-pao* of Sept. 1, 1908.

the Empire, and by applying these averages to the contiguous provinces or smaller divisions of the Empire, and to those among them which are known to be under similar geographic and climatic conditions, to arrive at probably a closer approximation of the population of the Empire than it has been possible to do with the data heretofore available.* These ascertained averages of the numerical value of the household (exclusive of infants below 6 years of age) are the following:

Chih-li	province	5.5	heads
Shan-hsi	"	4.2	"
Che-kiang	"	3.6	"
Ssŭ-ch'uan	"	4.0	"
Kuei-chou	"	5.2	"
Ki-lin	"	7.2	"
Hei-lung-kiang	"	3.1	"
Peking City		5.8	"
Shun-t'ien Prefecture (exclusive of Peking)		5.8	"
Manchu garrison of Canton		4.7	"
District of Kobdo		3.9	"

The mean average of the above is 4.8; this figure has been used in calculating the number of people in provinces to which none of the other averages could be properly applied. As regards the population of infants below 6 years of age, it has been assumed that the annual birth-rate in China cannot possibly exceed 1/100 of the total population, possibly less, in view of the apparent great numerical inferiority of females, and that the infantile death-rate must be as high, if not higher, than in those provinces of India about which we have trustworthy data—say between 40 and 45 per 1,000. On the basis of the population as furnished by the census we may assume that the infants under 6 years number between nine and ten millions.†

As regards the returns for the provinces of Ssu-ch'uan and Shan-hsi, they are incomplete, covering only 125 districts in the case of the former, and 87 in the case of the latter. I have accepted as correct the figures for the population of Ssu-ch'uan published in the *North China Daily News* of Shanghai on March 11, 1911, which says, on the authority of a Chinese newspaper whose name it does not mention, that Chao Erh-sün, Viceroy of Ssu-ch'uan, had re-

* The figures of population by heads are the totals of adult males and females plus the school children; the "able-bodied men" are not counted as they must be included in the enumeration by male adults.

† A foreign physician of Peking with a very large Chinese practice told me a few years ago that, after several years of careful enquiry, he had reached the conclusion that the death-rate of infants in Peking was considerably over 50 per cent. of the births.

ported to Peking that his province contained 9,205,200 families of 50,217,000 adults, 4,288,600 school children, and 8,669,000 "able-bodied men"—or 54,505,600 persons—infants excluded.

In the case of Shan-hsi I have found nothing better than to adhere to the total for that province given in my earlier study of the subject in 1905*, that is to say 10,791,000, and have, therefore, added a million to the recorded figure of the present census.

The population of the Empire (exclusive of Mongolia and Tibet), computed with the present available data and in the manner above explained, would appear to be, in round numbers, 325,000,000, as is shown in detail in Table I in which the figures obtained are compared with those reached by me in my earlier study of the question and there given as for the year 1885.

The present census supplies us with the number of people enrolled in the Manchu banner organization; it is 1,380,440 adults. If to this number we add the garrisons of Nan-king (Kiang-su), Chin-chou (Hu-pei), and Hang-chou (Ché-kiang), which are not included in the list, and which may roughly be put down at 5,500 families, or about 30,000 souls, infants included, and if we further add 40,000 infants to the recorded enumerated Manchu population, we reach a general total for the Manchu banners of 1,500,000 in round numbers.

The data now furnished us disclose an interesting and very important fact, if it should be corroborated hereafter; wherever the proportions of the sexes have been recorded the disparity in numbers is very great, males being largely in excess. In a few cases this excess of the male population may be explained by a recent influx of emigrants from other provinces of the Empire, as in the case of the two Manchurian provinces of Ki-lin and Hei-lung-kiang, or by the population being largely composed of troops, as in the case of Kobdo, or again by the locality in question being, as Peking, a great commercial center; but in others, and they are the more numerous, the disparity can only be explained by natural causes and conditions.†

Incomplete though the enumeration of "able-bodied" men is in the present report, it is of great interest to us, as it furnishes some idea of the relative proportion of this class to the whole male population. We are able to establish this percentage in the case of seven provinces; the mean average for this class in them is 40.20 per cent.

* An inquiry into the Population of China. *Smithsonian Report* for 1904, pp. 659-678, Washington, 1905.

† Mr. Rockhill gives the divergencies in the sexes as recorded in the returns now supplied in Table II, which is not reproduced here.

XUM

of the total male population. In Japan in 1898, the latest year for which I have authentic data, the males subject to conscription, 18 to 41 years of age, formed 36 per cent. of the male population.*

We are furthermore enabled to gather some approximate idea of the proportion of children under sixteen to the total male population in at least seven provinces of the Empire, the same for which we have the population of able-bodied men.† In Japan the population below 15 forms about 33 per cent. of the total population; in the seven Chinese provinces for which we have data, the number of children from 6 to 16 varies from 6.22 to 11.86 in every hundred adults. If to this we add the children below 6, which we have been led to believe form about 3 per cent. of the population, we have a percentage of from 9.22 to 14.86 per cent. We must, of course, only accept these figures for China as interesting, but not well-authenticated data.

As regards the population of the city of Peking, the census taken in 1908 by the Ministry of Interior after the division of the city into the present 23 police districts, gave the numbers as 69,579 "principal households" and 56,429 "sub-tenant households"; 79,009 in the Tartar or Inner City, and 46,999 in the Chinese or Outer City. Computed on the basis of 5.8 heads to the family, as supplied us by the present census, we find that in 1908 the population of the capital (exclusive, of course, of infants) was 730,846, of which 458,252 were in the Tartar city and 272,594 in the Chinese. The present census gives Peking a total population of 805,110. In 1908 the number of children attending school in Peking was 16,282 boys and 771 girls. In 1910 the children of school age in Peking numbered 47,653.

The returns before us do not supply sufficient figures for computing the population of Mongolia, they only cover the Jehol district and the Ch'ahar tribe—the yu-mu or "nomadic herdmen" of Southern Mongolia from the Great Wall to Alashan and as far north as Outer Mongolia; we are told that they number 348,000 adults. The total Mongol population of the Empire is usually estimated as about a million and three-quarters.

Although the new information furnished us by the census of 1910 is insufficient to base any conclusions on, it tends, at all events, to confirm the opinion I had reached in my earlier study of the question that the population of the Empire is much smaller than we have been

* The various percentages of able-bodied male adults in China, as shown by the present returns, are given by the author in detail in Table III.

† These percentages are given in detail in Table IV.

led to believe, and that in the last century it has been increasing very slowly, if at all.*

TABLE I.

ESTIMATED POPULATION OF CHINA 1910.

PROVINCE	POPULATION 1910	POPULATION 1885
Chih-li	22,970,654	17,937,005
Shan-hsi	9,422,871	10,791,341
Shen-hsi	6,726,064	3,276,967
Kan-su	3,807,883	5,411,188
Shan-tung	25,813,685	36,545,704
Ho-nan	22,375,516	22,117,036
Hu-pei	21,256,144	33,600,492
Ssu-ch'uan	54,505,600	71,073,730
Kiang-su (including Kiang-ning)	15,379,042	21,259,989
An-hui	14,077,683	20,596,988
Kiang-hsi	16,254,374	24,541,406
Hu-nan	20,583,187	21,005,171
Kuei-chou	9,266,914	7,669,181
Yün-nan	8,049,672	11,721,576
Chê-kiang	13,942,655	11,684,348
Fu-kien	8,556,678	23,502,794
Kuang-tung	23,696,366	29,740,055
Kuang-hsi	5,426,356	5,151,327
MANCHURIA.		
Fêng-t'ien	5,830,819	....
Ki-lin	5,349,287	....
Hei-lung-kiang	1,562,254	....
TURKESTAN.		
Hsin-kiang (whole province)	1,768,560	....
TIBETAN MARCHES.		
Marches of Ssu-ch'uan and Yün-nan	195,496	....
TOTAL	316,817,750	377,636,198
Infants under 6	9,000,000 (?)	....
Mongolia	1,800,000 (?)	....
Tibet	2,000,000 (?)	....
TOTAL	329,617,750	

* See Walter Francis Willcox. The Expansion of Europe in its influence on population, 1906, pp. 55–57, 66–70. Reprinted from *Studies in Philosophy and Psychology*, a commemorative volume dedicated to Prof. Charles E. Garman of Amherst College.

XUM

LIFE ALONG A GRADED RIVER

BY

F. V. EMERSON
University of Missouri

The Missouri River, rising in southwestern Montana, joins the Mississippi a few miles above St. Louis after flowing a distance of about 2,340 miles. In this distance the river falls 4,000 feet, with an average fall of 1.7 feet per mile. For much the greater part of its course the fall is much less. From Great Falls, in Montana, about 2,000 miles from its mouth, the average fall is less than four inches per mile, a fall which decreases down stream until near its mouth the fall is scarcely more than an inch per mile. (Fig. 2.)

The Missouri drains about 527,000 square miles. Much of this drainage area is covered with fine soil. Consequently, the river carries a heavy load of fine sand and silt, a load that is reflected in its Indian name of the "Big Muddy."

With its low grade and heavy load this river in its lower course has ceased to be a degrading stream.* The current in the lower two-thirds of its course rarely, if ever, flows upon a rocky bed, but rather on alluvium often 100 feet in thickness. From Montana to its mouth the present river is essentially a graded stream.† The stream meanders in a steep-sided valley trough from one and one-half to seventeen miles wide, and, except where the river touches the bluffs on either side, the main stream activity consists in reworking its own load, now depositing the load and again picking it up and carrying it a short distance down stream. Owing to the melting of snow in its upper basin and to the spring rains in its lower basin the river is subject to spring floods that often cover the valley bottom from bluff to bluff. During such times, the augmented current works with renewed energy in the soft materials of the flood plain, and changes in the river course are then most frequent. At such times the river frequently changes its channel, forms and destroys bars and islands, and cuts across the spurs projecting into meanders, thus shortening its course.

All these conditions affect in a marked degree the life of the people living on the river flood plain. The "river bottom folks"

* This expression means, in physiography, a stream that reduces or wears down a land surface.
† That is, it no longer very actively builds up or wears down its course.

have special problems which grow out of their physiographic environment. The study of their geographic responses which constitutes the subject of this paper was made during a trip along a short stretch of the river. It embraces the river portions of Carroll, Saline, Chariton, Howard, Cooper, Boone and Moniteau Counties. (Figs. 1 and 3.) The conditions in this stretch of the river are typical of those along the entire graded stretch.

Navigation. The first response, in chronological order, made to the river was navigation. The river afforded at all times of the year an easy, if treacherous, waterway for canoes and boats of light

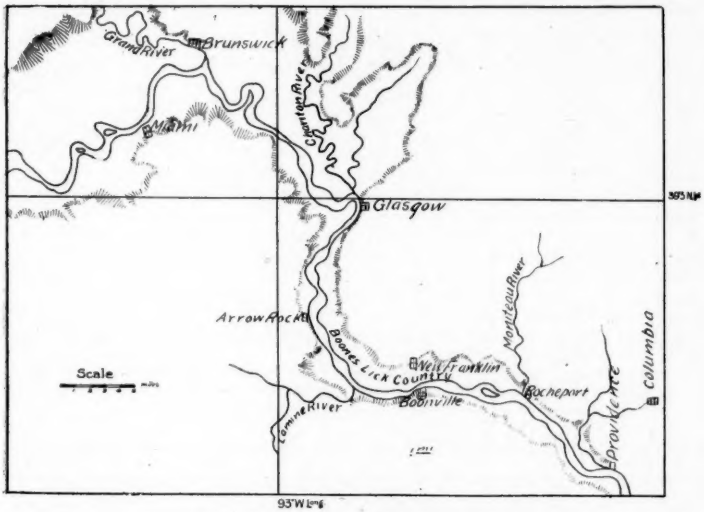

FIG. 1—Map of a part of the Missouri River.

draught. The flood plain did not become an important land highway, although portions of it were used. The flood plain was often wet and heavily forested while the prairies a few miles back from the river were smooth and generally not in forest. The principal routes, therefore, especially after stage routes were established, were generally on the uplands. As in nearly all settlements of a new area, the hunter and trapper were the first visitors. The names of French origin which nearly every important tributary bears, show the influence of the French explorers. But the French were adventurers or hunters, and they left little permanent imprint on the region. The earlier settlers, and, in fact most of the later ones,

were largely from Kentucky, Tennessee and Virginia. The easy waterway down the Ohio and up the Mississippi and Missouri offered a direct, easy passage to Missouri, whose climate was not unlike that of the home states.

With the advent of the steamboat, about 1819, began a river traffic which expanded to large proportions and declined only when the river was paralleled by railroads. This traffic was of the utmost importance in the settlement of Missouri and of the entire northwest. It early fixed a relatively dense population in a narrow zone along the river. (Figs. 4 and 5.) An interesting outgrowth of this population zone is seen in the educational institutions of Missouri, aside from the Normal Schools, which schools were established relatively recently. (Fig. 6.) Their proximity to, and parallelism with, the river is a striking response to the river influence.

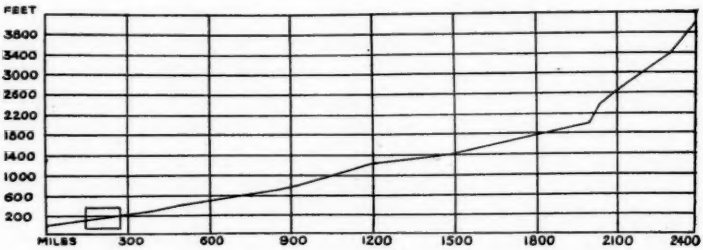

FIG. 2—Profile of the Missouri River from Three Forks, Montana, to its mouth. The square indicates the region described in this paper. From "Profiles of Rivers in the U. S.", by Henry Gannett. *Water Supply and Irrig. Papers*, No. 44, 1901.

The steamboat captain found the Missouri a treacherous and changeable stream, as, indeed, a graded river must necessarily be. Bars and channels shift and the steamer is liable to run into a sand bar. If this happens when the water is falling, the boat may be held for a year or more in the sand until high water will float her off. If the boat sinks, the hull is often filled with fine sand and she cannot be raised or her cargo rescued. Often a shifting of the river channel will leave a sunken boat inland and the cargo and machinery can be dug out. But the accident most feared was collision with sunken logs and stumps, snags, as they are called. In 1819 the *Thomas Jefferson,* carrying a Government exploring party, was the first to be sunk by a snag. During the following seventy-eight years, 193 sunken boats, or 67 per cent. of all wrecks, were due to snags.*

* Causes of wrecks in the Missouri River and their number from 1819–1897: Snags, 193; Fire, 25; Ice, 26; Rocks, 11; Explosion of Boiler, 6; Sand bars, 4; Collision with bank, 1; Storms and wind, 2; Collision, 1; Overloading, 1; Swamping in violent eddy, 1; Unknown, 14. From the *Annual Report of the Missouri River Commission, 1897, p. 3870.*

It follows that one of the most important Government activities in improving the river consists in removing these snags. Snag boats patrol the river especially at low water, when the snags can be more easily observed. The snags are either sawed off or torn out. The bottom lands, if undisturbed, are soon covered with a timber growth, as, indeed, are also the enclosing bluffs. Trees, logs and stumps are thus readily taken by the current and become embedded in the sand of the channel, where they are the dreaded snags which no pilot can foresee.

Despite the dangers of navigation, the traffic was profitable. In the days of the north-west fur trade, boats not infrequently cleared $50,000 for their owners in one trip. The river traffic developed in

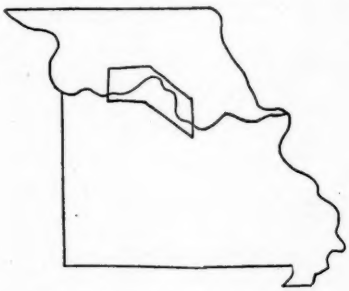

FIG. 3—Shows the area described in this paper.

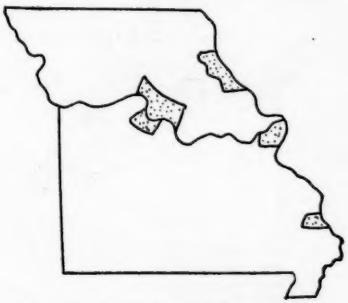

FIG. 4—Population of Missouri in 1830. Dotted areas have density of 10 to 20 per square mile. Density less in the rest of the State.

the pilots a remarkable class of men. They knew the entire course with wonderful accuracy. Light-houses were not then established, and at night pilots could infer their position by the reverberations of their whistles from the bluffs on either side. The pilots often received a salary of $300 per month.

Settlement. The "Boones Lick Country" (Fig. 1) early drew immigrants. The river in this locality is eroding its southern bank, and has a flood plain between the stream and the northern bluffs two miles or more wide and nearly twenty miles long. Immigrants to central Missouri made this region a resting point from which they could determine their future location.

The river bottom soon became relatively densely settled, but the early settlements did not spread to the adjoining prairies for several reasons. Most of the settlers were used to a wooded country like the bottoms, and believed that prairie lands which would not raise

XUM

timber must be worthless. It was not for several years that the experiment of wheat growing was tried on the prairies. An enterprising pioneer broke a small patch of prairie and sowed about three pecks of wheat and was astonished at a yield of 20 bushels.

The timber afforded materials for the cabins, and land did not seem worth the trouble unless it must be cleared first. The rushes growing on the wet lands remained green in their lower portions during the winter and afforded pasturage during that season, while the nettles growing on the low bottoms near the river gave fibre from which clothing was made. Moreover, there was constant danger from Indians. The river afforded easy communication in such cases and the prairies were not only at a considerable distance,

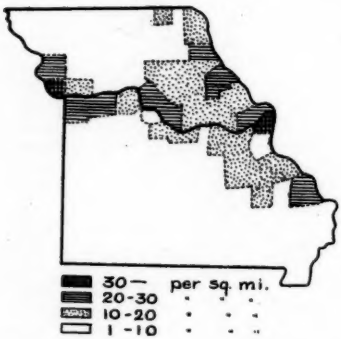

FIG. 5—Density of population in Missouri in 1850.

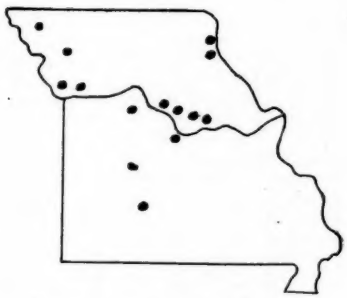

FIG. 6—Location of leading schools in Missouri.

but were separated from the river bottoms by a belt of maturely eroded country, the "rough country." This "rough country," besides being difficult to traverse, gave opportunities for ambuscades.

The growth of towns. Naturally, at such a focus of travel as the Boones Lick Country, a town sprang up. In the location of their town the settlers showed their unfamiliarity with the habits of a graded river. Franklin was built in a low portion of the flood plain where the river was narrow and the passage, therefore, was short. (Fig. 7.) The town was laid out in 1817 and at once became a distributing center for a large region, and the seat of a Government land office. Four or five years later a caravan was fitted out for the Santa Fé trade, which soon attained large proportions, and Franklin became the starting point of caravans.

The existence of Franklin, however, was brief. In about nine years, at high floods, the banks began to cave into the river. The

settlers had believed that the interlacing tree roots would preserve their lands from the lateral planation of the river. The river continued its encroachment and, in 1832, the citizens abandoned the town. Some moved to the bluff across the river where the town of Boonville was springing up. Others, learning the lesson, moved their goods and often their houses, about two miles back to the bluffs, where they built the town of New Franklin. (Fig. 7.) The site of Old Franklin is now nearly submerged. Other and less important towns along the river were built on the flood plain with the same disastrous results.

Settlements spread rapidly up the river, but were for years largely confined to the flood plain. The narrow strip of flood plain enclosed on one side by the river and the other by the bluffs became

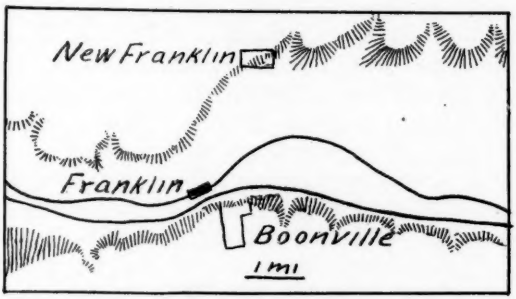

FIG. 7—The neighborhood of Franklin. From the Boonville sheet U. S. Geol. Surv. The site of Franklin is now largely covered by the Missouri.

nominal geographical units and were often called by the name of some early or prominent settler. For example, the flood plain north of Arrow Rock was called "Cox's Bottom."

Towns sprang up along the river. Many were laid out on the flood plains, but were soon abandoned. There was the menace of the fate that befell Franklin, and also the danger and inconvenience from recurrent floods. Moreover, the flood plain dwellers were subject to frequent attacks of malaria, and this alone caused the abandonment of several towns.

From the founding of Franklin in 1817 it required nearly twenty years for the settlers to learn the proper relation between the habits of a graded river and the best location for town sites.

Wherever a meander touches the limiting bluffs of the valley, or the river swings against them, is a favorable town site. A glance at Fig. 1 will show that, almost without exception, the principal

towns along the graded portions of the Missouri and Mississippi have this location. The swiftest current in a meander swings against the outer shore of the meander, thus bringing deep water and easy landing for boats near the shore. The bluffs and adjacent higher ground afford easy drainage and sewerage, and are not subject to flooding.

Arrow Rock (Fig. 1) has a favorable location, and a trading post was established there as early as 1807. The location of this post

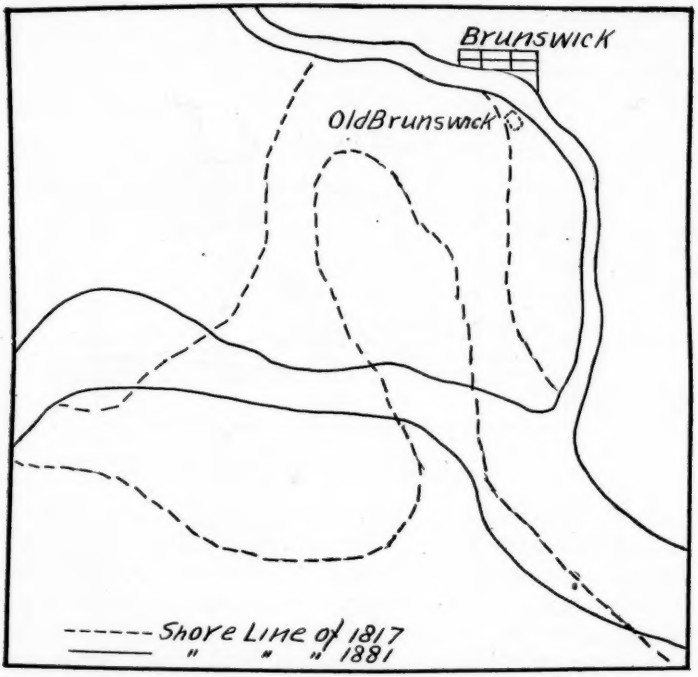

FIG. 8—Showing the Missouri River near Brunswick. From *Rept. on Survey of the Missouri River, Appendix 5, 1881.*

was partly in response to a ferry at that point. The post, however, did not grow to importance. Miami, with its fine location, was the site of an Indian village. It became a prosperous town, and for a time was the terminus of a packet line to St. Louis.

At several points along the valley, not only does the river swing against the bluffs, but at such a point there is an important tributary stream which gave easy access to the country at a considerable dis-

tance from the river. Almost invariably a town grew up at such localities. Warehouses were built at Providence at the mouth of the Perche. At the mouth of the Moniteau Creek, trade was brisk as early as 1820. In 1804 the Lewis and Clark expedition camped here. Soon the town of Rocheport was founded and boat-building became an important industry.

The two most important towns in this area were Brunswick and Glasgow. Both were laid out in 1836. Both were preceded by unsuccessful towns which were built with but little regard for physiographic conditions.

Near the site of Glasgow (Fig. 1) the Chariton River enters the Missouri. The Chariton gave access to a fertile back country and its confluence with the Missouri was recognized as an important town site. As early as 1817, the year in which Franklin was founded, the town of Chariton was laid out on the flood plain about two miles above the confluence. While Chariton did not suffer the fate of Franklin of being washed into the river, the site was subject to floods and consequent malaria. It was abandoned in 1829. Thorntonsburg, nearer the confluence, was laid out in 1832, but was soon abandoned. Finally, the proper geographical response was found, and Glasgow was laid out in 1836 on the bluffs about a mile below the confluence of the rivers. The town prospered and became an important point of river traffic, and a distributing center for the Chariton country. It is still a flourishing little city.

Brunswick (Fig. 8), at the mouth of the Grand River, had a similar history. It was first laid out on the flood plain at the foot of the bluffs. Before any considerable growth had taken place, a new town was founded on the bluffs (1836). At that time the Missouri swung northward and joined the Grand at the foot of the bluff on which Brunswick is built. (Fig. 8.) Like Glasgow, Brunswick had a good site and river frontage. It was the distributing center for the Grand River country, and became an important river town.

(To be concluded.)

XUM

PROGRESS OF TROPICAL EAST AFRICA*

German East Africa bids fair to have larger economic development than was anticipated during the first years of the German occupancy. Mr. Müllendorff, editor of the *Cologne Zeitung*, who spent several months in the Colony, has given the results of his observations in this book, with special attention to the present status of colonial activity in the German and English parts of East Africa, to the development of technical methods in all branches of colonial exploitation, and to the possibilities of the country for permanent settlement by Europeans. His impressions are encouraging. The greatest obstacle, he says, is the influence of Mohammedanism. East Africa, in spite of German and English occupation, is practically a Moslem country. The conversion of the natives to Mohammedanism is much easier than the acceptance of Christianity, because only a declaration of faith, and circumcision are required, without the long preparation for baptism which the Christian missionary inflicts upon his disciples; consequently the name of Mohammed is much more popular with the natives than that of Christ. Moreover, the rivalry among missionaries of different denominations undermines the confidence of the natives in their teachings; and the partition of East Africa by two of the Colonial powers often stands in the way of economic progress.

Physiographically, three regions may be distinguished: First, the coast where hemp, rubber, and cotton are grown with increasing success; second, the steppe, which has so far repelled all attempts at cultivation; third, the highlands of the interior whose qualities for cultivation are becoming more and more appreciated as colonization advances. Much is done on both sides of the line to ascertain their possibilities for profitable settlement; but the methods used by the two governments are quite different. The English experimental stations and farms serve distinctly practical purposes; their object is to show the colonists how to conduct a farming or cattle business on a paying basis, while the corresponding German institutions are doing mainly scientific work, taking it for granted that the practical application of such work will be a matter of course when occasion arises.

The Biological and Agricultural Institute at Amani, in the mountains of Eastern Usambara, is the leading German institution of this class. It has about 700 acres of land under cultivation, at elevations of from 1,300 to 3,600 feet above sea-level. The institute is housed in fifteen stone buildings, both dwellings and laboratories. The work is done partly in experimental fields where the qualifications of the different plants for cultivation on certain soils, and at certain heights, are studied, partly in the primeval forests, partly in the laboratory. Unknown trees in the woods, for instance, are marked by fixing numbers to the stems—the figures, at the time of the author's visit, ran up to over 1,800, which means that so many trees were under observation. In due season, blossoms and fruits are sent, with the number of the tree, to the botanical center for identification. Scientific forestry is receiving a powerful impetus in this way. It is a great drawback that, owing to the governmental predilection

* Ost-Afrika im Aufstieg. Von Prosper Müllendorff. v and 253 pp. Maps. G. D. Baedeker, Essen, 1910. Mk. 2.40. 9 x 6½.

for rotation in office among its employees, the foresters do not, as a rule, stay long enough to become personally acquainted with the flora of their respective districts. Although the government does not manufacture the lumber, but leases the privilege to a number of lumber companies, it should use its staff to determine the uses of the native woods, and should try to introduce them on the world markets. So far, good results have been obtained with a native cedar, *Juniperus procera,* for furniture, panelling, shipbuilding, as well as for pencils, brushes, and toys. Another tree, known as *Mkweo,* supplies a kind of lumber similar to walnut, and has been used with good effect, for the woodwork of the smoking saloon of a Lloyd steamer.

Experiments with rubber trees have shown that the species best fitted to the country is *Manihot Glazovii,* because it stands the dryer climate of East Africa better than the standard species, *Hevea Brasiliensis.* The product is not yet equal to genuine *Hevea* rubber because it cannot be produced as pure as the South American kind. Further experiments which the planters have made on their own account seem to prove, however, that it can be purified and a standard quality, fully able to compete with other brands, may be produced. Shaped into bricks and with a stamped guarantee of its quality, the purified product may be put on the market without being classed with the inferior domestic kind.

Sisal hemp promises to become the leading product of German East Africa. Its culture was started with seventy-two sisal plants imported from Yucatan twelve years ago, and as sisal has proved equal to Manila hemp for all kinds of cordage, and is adapted to many other industries as well, its export value had grown to $500,000 in 1907, increasing in Tanga alone, by 150 per cent. that year.

Cotton has not yet passed the experimental stage, but much attention is given to it on account of the large amounts needed by the mother country. The species best adapted to the climate has not yet been determined, but the results are encouraging. The greatest obstacle to finding a market for the quality grades is that cotton is a very popular culture with the natives, and their careless ways of picking and cleaning it have brought discredit not only on their own products, but the prejudice has naturally been extended also to the much better kinds produced by the white planters. Energetic measures by the government and the Planters' Associations will be needed to overcome this disadvantage.

Coffee, in spite of early failures, is now doing splendidly in East Usambara. While formerly it had to be sold under a Brazilian name in order to find buyers at all, it has now made for itself a place on the European market, and is considered a good quality brand by the brokers.

The cooler highlands of tropical East Africa promise also to become great cattle countries. Owing to the fact that the dry season lasts only three months, against six in South Africa, and that there is no winter, only the rainy season, the pastures may be used all the year round. Sheep farming for wool and mutton is profitable and quite popular with the English farmers, while the Germans prefer to raise hogs. With ostrich farms, successful experiments have been made in British East Africa. Vegetables, especially beans, as well as berries and fruit seem to find the country well suited to their needs, and could be raised profitably if there was access to large markets. The lack of roads and railroads is the greatest deficiency of East Africa, and it is even greater

XUM

on the German than on the English side. With good roads and modern machinery, the country will have a great future.

It is not a country for the poor immigrant and small farmer. People going there must have a handsome sum to invest, but when properly managed the plantations bring good returns, and the number of people, especially among the English, who derive a comfortable income from their East African possessions, is increasing every year. The best proof of the promising character of the country is, perhaps, the considerable number of white people not German or English who have settled there from abroad. In the Kilimandjaro region the Boers are a not unmitigated blessing. Their habit of killing all the game they can reach regardless of governmental regulations, makes them rather unpopular; but as pioneers on hitherto untrodden paths even the Trek-Boers are fulfilling an historic mission, and besides, a great many of them have already come to stay as regular settlers. Aided by their South African experience, they become most successful farmers and cattle raisers. They send their children to the governmental schools and seem perfectly willing to become good German citizens. From Egypt, many Greeks have immigrated; they also make very desirable colonists, economically and politically. Russo-Germans, however, from the Caucasus country were not satisfactory. They had lived so long in a half-civilized environment that they had lost all qualities for good citizenship. They did not want to work, nor send their children to school, and were generally a lawless and violent set, so that most of them were sent back to their old homes.

The management of the natives is becoming easier. The best way to obtain an influence over them is to make the chief see the advantage of European methods and let him influence his people. In the larger places on the coast, the government schools, mostly trade schools, do good work, especially when the instruction is unsectarian. On the Usambara railroad the employment of colored train hands has been tried for the first time, and successfully. This peaceful penetration with sufficient capital, roads, and machinery, is the indispensible prerequisite for the future development of these promising regions.

MARTHA KRUG GENTHE.

GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

AN EXHIBITION OF PHOTOGRAPHS. The Society opened in its house on Sept. 9, an exhibition of about 700 photographs illustrating scenic aspects and phases of development in the western half of the United States and in the southern States. A series of views of the North Carolina Appalachians is shown to contrast their picturesque and quiet beauty with the grand and rugged aspects of our western scenery. Lands reclaimed by irrigation and dry farming, western towns fostered by mining, lumbering, agricultural and other interests are shown; also many of the activities in our southern States including truck farming, plantation scenes, live-stock and manufactures. A few typical American cities, including Cleveland, Toledo, Detroit, Duluth, Seattle, Portland, Ore., San Francisco, Salt

Lake City, Memphis, Chattanooga, Atlanta, New Orleans and Galveston are represented by panoramas or small photographs. The exhibition is open to members of the Society and the general public between 10 A. M. and 5 P. M.

NORTH AMERICA

THE STORM KING CROSSING OF THE HUDSON RIVER. Prof. J. F. Kemp has written for *"The American Journal of Science"* (July 1912) a paper on the crossing of the Hudson R. at Storm King by the new Catskill Aqueduct. The aqueduct was to cross through the bed rock of the Hudson from Storm King Mountain on the west bank to Breakneck Mountain on the east. It was necessary to find bed-rock. In 1908 the drill, with great difficulty, was sent down in the middle of the river and at a depth of 580 feet the hole was still in sand and boulders. Bed-rock had not yet been reached.

It was hoped in 1909 to drill down to bed-rock before the freezing of the river made further operations impossible. This hope was not realized, for the bottom of the hole at 768 feet was still short of bed-rock when winter closed in. It was thus proven that the bed-rock granite of the Hudson at the Storm King crossing was more than 768 feet below the surface of the river; but it was also ascertained that, 675 feet to the west, bed-rock was only a little over 500 feet below the surface; and 675 feet to the east, bed-rock was encountered at 450 feet below the surface.

The work done since then shows that the bed-rock of the Hudson lies between 768 feet and 955 feet below the surface of the river. It was wholly unexpected that the bed-rock would be at so great a depth. The larger portion of the rock is granite from shore to shore and for a mile or two on each side. It is a part of the large Storm King batholith which is so important a feature of this portion of the Highlands.

In excavating the tunnel through bed-rock only two small faults were encountered in the rock. These faults are the chief source of the small amount of water entering the tunnel. Although the tunnel is 3,022 feet from shaft to shaft and is 18 feet in diameter, the wall-rock is practically dry throughout the larger part of its course.

If water erosion of the bed of the Hudson is not the cause of the great depth at which the bed-rock is found, then the Storm King Pass has been overdeepened by some other agent than water. There is but one other agent and that is ice. "Sub-glacial erosions would therefore follow. Opinion in America in recent years has been predominantly against glacial erosion, but various lines of evidence are making this process more and more probable. The Storm King Crossing would seem to be a favorable place for it."

WATER TRANSPORTATION BETWEEN CHICAGO AND THE MISSISSIPPI. A canal boat carrying a cargo of salt left Chicago on June 1 last, passed through the Chicago River and Drainage Canal to Lockport, thence by the Illinois and Michigan Canal to La Salle, thence by the Illinois River to the Hennepin Canal and thence to the Mississippi, which was reached on June 8, and the cargo quickly and economically unloaded at Muscatine. The trip was made to illustrate the possibilities of a deep water canal between the Great Lakes and the Mississippi and has at least proved the feasibility of a canal boat haul for cargo over this distance. It is now proposed to bring several vessels from the Erie Canal and use them for carrying salt by this route to various points in Iowa.

The Hennepin Canal is in fine condition with plenty of room, good water, and a good lock service. It is recommended that the locks on the old Illinois and Michigan Canal should be enlarged to the size of those on the Hennepin Canal, the depth increased to 8 feet and the sides strengthened. Barges 30 feet wide and 140 feet long carrying 800 tons could then pass between Chicago and the Mississippi and enable an enormous tonnage to be very economically carried.

OUR COAL PRODUCTION IN 1911. The total quantity of coal mined in the United States in 1911 was 496,188,308 short tons; in 1910 the total was 501,596,378 short tons. We are now mining about a half billion tons of coal a year.

XUM

WATER POWERS OF NORTH CAROLINA. The North Carolina Geological and Economical Survey has issued *Bulletin* No. 20, "Water Powers of North Carolina," presenting a large amount of data relating to the flow and power of North Carolina streams. These data consist chiefly of gage heights and discharge measurements which are used to show the continuous daily flow of the streams; also river profiles that can be used to estimate the available fall at any place. North Carolina stands perhaps first in the number and magnitude of her available water powers. Since 1898 the State survey, in cooperation with the U. S. Geological Survey, has maintained gaging stations on the principal rivers and streams at which daily measurements have been made of the height of the river surfaces. Measurements have also been made of the flow and volume of water. These data have made it possible to prepare tables giving the amount of available water that a stream will carry and how much this can be increased by storage and reservoirs. The present volume presents the results of these investigations carried on through a term of years, so that the results given regarding the available water power at all seasons of the year can be relied upon as accurate.

MAP OF ILLINOIS. A second edition of the "New Base Map of Illinois," on a scale of approximately eight miles to the inch has been prepared by the State Geological Survey. It is in three colors, drainage features in blue, railroads, land lines, towns, etc., in black, and county boundaries and altitudes in red. The map eliminates the errors of early land surveys, so that places are shown with correct latitude and longitude. Railroad alignments are all highly accurate.

THE PARKER EXPEDITION TO MT. MCKINLEY. The members of the expedition led by Prof. Herschell C. Parker have returned home after having, with great difficulty, ascended Mt. McKinley to an altitude of about 20,000 feet. They were only about 300 feet from the summit when a very hard storm compelled them to give up the attempt. The party charted a large area that had not hitherto been mapped and practically demonstrated the possibility of reaching the top of Mt. McKinley by the northern or Muldrow glacier route.

THE PORT OF PRINCE RUPERT. Prince Rupert, on the Pacific Coast about 550 miles north of Vancouver, is the Pacific terminus of the Grand Trunk Pacific Railway and is destined to become a very important seaport. Its development is rapidly progressing. Its harbor is formed by Kaien Island on the southeast, and Thompson peninsula and Digby Island on the northwest. The entrance is about a half mile wide at its narrowest point and no harbor along the coast can be more easily entered. It is about nine miles long and three-quarters of a mile to a mile and a half wide. The shore is rocky, falling off steeply to a depth of 120 feet. For this reason the wharves on the Prince Rupert side of the harbor have to be built along the shore line without slips.

Port Edward, eight miles from Prince Rupert, is now being developed as an industrial center, and is being connected with Prince Rupert by rail. It has exceptional facilities for the erection of wharves and the dockage capacity, per unit of water-front, will be much greater than Prince Rupert itself can offer.

SOUTH AMERICA

NEW PORT OF VALPARAISO. Valparaiso has the most commodious harbor on the western coast of South America but unfortunately it is open to storms from the north which occasionally do much damage to shipping in the harbor. The harbor works which it was expected would fully obviate this difficulty and make the harbor entirely secure were destroyed by the earthquake of 1908. The construction of a new port is now in progress. It will provide a harbor, capable of berthing the largest modern ships and will include: a breakwater, 945 feet long; a quay wall, 2,066 feet long, strengthening and extending the fiscal wharf to a length of 1,214 feet; another quay wall 600 feet long; a jetty, 820 feet long and 328 feet wide; a coal wharf, 656 feet long and 328 feet wide; a coal wharf, 656 feet long and 100 feet wide, including coal transporters, hoists, cranes, rail-

road, etc. All the necessary customs and other warehouses, administration buildings, lighthouses, and coastguard stations are also to be provided. The new harbor, when completed, will have a depth of forty feet of water. (*Shipping Illustrated.*)

BOLIVIA'S NEW CONNECTION WITH THE PACIFIC. The third railroad between Bolivia and the Pacific is practically completed and traffic will probably be opened in September. This is the railroad between the Port of Arica, Chile, and La Paz, Bolivia. Built across the Andes, some unique engineering problems were involved. The cost of construction was about $14,600,000. The line is 264 miles long. As Arica is one of the best ports on the South Pacific coast, it is expected that the line will compete sharply with the earlier rail routes to Bolivia. It gives the shortest haul between that republic and the Pacific. It has one disadvantage, however: for about twenty-five miles the grade is too steep for an ordinary track and a rack road is employed, which involves some delay and extra expense.

PRIMITIVE MAN IN SOUTH AMERICA. In 1910 the Smithsonian Institution sent Dr. Ales Hrdlička, Curator of Physical Anthropology in the U. S. National Museum, to make a study of available material relating to ancient man in South America. He had already studied the same problem in North America and was much interested in the evidence bearing on the antiquity of man in the southern continent. As geological investigation is important in studies of this character, Mr. Bailey Willis, of the U. S. Geological Survey was detailed to accompany Dr. Hrdlička. The chief purposes were to examine skeletal remains in Brazil and Argentina and the localities and deposits from which these finds came.

The Museum collections in Argentina were studied and also several localities where important specimens had been found. The researches occupied about three months. Every specimen relating to ancient man that could be found was examined and every important locality investigated. The general results of the inquiry are not in harmony with claims previously made by various students who reported the finds. The conclusion was reached that, to the present time, the evidence is unfavorable to the hypothesis of man's great antiquity in that region, especially as to the existence of very early predecessors of the Indian in South America; nor does it sustain the theories of the evolution of man in general or even that of an American race alone in the southern continent. The facts collected merely attest the presence of the already differentiated and relatively modern American Indian. Early man may have existed in South America, but this proposition is not yet established.

AFRICA

THE RIFT VALLEY IN CENTRAL AFRICA. Prof. George L. Collie, of Beloit College, Wis., has a paper on the "Plateau of British East Africa"* in the *Bull. Geol. Soc. of Amer.* (Vol. 23, 1912, No. 2, pp. 297-316), in which he describes the geology and physiography of the Plateau and devotes several pages to a discussion of the Great Rift Valley which extends, according to the supposition of Suess, from Lake Nyasa in about 15° S. northeasterly to the neighborhood of Antioch, Syria, 35° N. Lat. a distance of nearly 3,500 miles. After a discussion of the Valley in British East Africa, as to its position, origin, escarpments, valley-floor, lakes, drainage, etc., he ventures to predict the fate of the Rift Valley in the future.

"Since the Rift is a valley of accumulation," he says, "it might become filled with detritus in the course of time, but it would take long to obliterate it by this method. Erosion, however, is removing the divide which separates it from the Victoria basin, and that with rapidity. When this divide is taken away, the warm, moisture-laden winds from the Congo region, which now precipitate their contents on the western slope of the divide, will sweep across the Rift Valley

* Prof. Collie's paper "The Plateau of British East Africa and Its Inhabitants" appeared in the *Bull. Amer. Geog. Soc.*, Vol. 44, 1912, No. 5, pp. 321-334.

XUM

and yield their rainfall to the eastern escarpment. Streams will then flow across the present Rift to the Nile basin, and the Rift Valley will be added to that great system of drainage. The east wall will then be attacked and retreat until a suitable gradient has been established to the Nile. By that time the Rift will largely disappear, perhaps leaving no trace of its existence. All that may be left to tell the story of its greatness and uniqueness will be the records of those who saw it in its pristine days."

GROWTH IN POPULATION OF THE ANGLO-EGYPTIAN SUDAN. In Lord Kitchener's *First Report* on the Anglo-Egyptian Sudan, he presents figures for population that strikingly illustrate the progress of this vast territory under British administration. Before the Mahdists conquered this southern territory of Egypt, the population numbered about 9,000,000. It sank to 2,000,000 as the result of the Mahdist *régime*. The population is now 3,000,000 again and Lord Kitchener predicts that in all probability it will double that figure in five years. (*The London Times Weekly edition No. 1,849, 1912.*)

PORT SUDAN. A few years ago there was not even a native village where Port Sudan now stands on the Red Sea. The value of the imports received at Port Sudan in 1911 was about $6,500,000, more than double the value of the imports in 1909. The value of the exports in 1911 was about $1,290,000 and exports continue to increase at a remarkable rate. One of the chief causes of this development is the extension of the railroad to the south of Khartum which has brought the fertile Gezireh district between the White and Blue Niles into direct and easy communication with the sea by way of the railroad that extends from the Nile to Port Sudan. In the near future the trade of the Anglo-Egyptian Sudan will be a very important feature of African commerce. (Condensed from *Board of Trade Journal*, Vol. 78, 1912, No. 822, p. 524.)

ITALIAN SOMALILAND. Some additional light on the imperfectly known geography of this regions is given by Professor Baldacci of the University of Bologna in a recent number of the *Revue Économique Internationale* (Vol. III, No. 3, 15-20 Sept., 1911). Italian Somaliland covers a total area of about 150,000 square miles. Its 300,000 inhabitants are largely nomads in whom the spirit of independence is strong and whose nature is warlike. The natural region of which the Italian colony forms part has a fairly well defined trapezoidal shape. It is washed on two sides by the waters of the Indian Ocean and extends inland to Lake Rodolf and the Ukamba district. This physiographic unit stands out conspicuously as a sloping plain devoid of noteworthy orographic features. Starting from its lowest point along the mouth of the Juba R. it rises gradually in all directions to a height that does not exceed 1,000 meters except on its northern boundary. The whole region is somewhat arid. In the north the small watercourses bear close resemblance to the wadis of the Sahara desert. In the south, streams vanish in the sands before reaching the coasts. The Juba alone discharges its waters into the ocean although not before having lost a large percentage by evaporation.

The most important economic district of the Italian colony is near its southern border. It comprises the valleys of the Juba and Shebeli. Agriculture, forestry and cattle-raising appear destined to thrive within its borders. Kismayu its natural harbor, however, lies just beyond the boundary on British territory. At present banana, corn, sesame, tobacco and cotton are raised by the natives, who manage often to obtain three to four crops yearly despite their primitive methods of work.

EMIN PASHA'S UNPUBLISHED SCIENTIFIC MEMOIRS. The scientific data of this famous explorer are collected in sixteen manuscript volumes and accompanied by many loose sheets on which Emin Pasha had recorded his routes in the Congo after his separation from Dr. Stuhlmann. Only eight of these volumes are actual notes of travel. The others contain zoological and meterological data. They comprise the period between 1874 and the date of his murder by natives on Oct. 23, 1892. Emin Pasha was much involved in the political affairs of the natives and his notes on this phase of their development are as interesting as

his scientific data. The story of the vicissitudes that befell these documents is given in the *Boll. Soc. Geogr. Ital.* (July, 1912).

After the explorer's murder all his notes were preserved by the Belgian authorities and in time were given to one of his daughters in Berlin. They were sold by her to a wealthy man of that city who eventually emigrated to America. All trace was lost of them at last and it was not till two years ago that Dr. Stuhlmann learned that they were in America and had been offered for sale. Subsequently they appeared for sale in the hands of G. Schultzer, of Berlin, a nephew of Emin Pasha. After their authenticity and scientific value had been ascertained, Dr. Stuhlmann persuaded the managers of the Colonial Institute of Hamburg to buy the whole set.

AUSTRALASIA AND OCEANIA

The Census of the United States Samoan Islands. By direction of the Governor-General, Captain William M. Crose, U. S. N., the census of American Samoa was taken on February 1, 1912. The figures have been published in the government newspaper, *Le Fa'atonu,* for May and are summed up in the following table:

	SAMOANS	OTHER POLYNESIANS	HALF CASTES	CAUCASIANS	TOTAL
Tutuila East	2,750	74	200	162	3,186
Tutuila West	2,133	44	76	15	2,268
Manu'a	1,776	3	16	2	1,797
Total	6,659	121	292	179	7,251

In 1892 Dr. Reinecke gave the round number of 4000 as the population of Tutuila and Manu'a, certainly without inclusion of Caucasians and probably meaning Samoans only. This figure derives from the seldom trustworthy returns of the Samoan pastors to the London Missionary Society; while fairly accurate as regards their own parishioners their reports always tend to minimize the numbers of those affiliated with the older communion.

This official census subdivides the total population into males 3836, females 3415. From these totals should be withdrawn the official population of the naval establishment, 193 men, 16 women. Thence is derived the record of indigenous population as 3643 males and 3399 females, which corresponds in reasonable accuracy with Reinecke's showing for Upolu and Savaii of 16,850 males and 15,950 females. These records show quite plainly that the Samoans are not a dying race. They are now far below the limit of agricultural toleration of their land and it is expected that with the amelioration of their condition under enlightened administration and with the cessation of the wars which have desolated the islands for at least two generations, a marked improvement in the statistical position will become manifest. W. C.

POLAR

Greenland Again Crossed. It was reported in the *Evening Journal* of New York on September 13, that Dr. M. A. Quervain, a young Swiss meteorologist who had had some experience on the inland ice of Greenland, has crossed the inland ice from West Greenland to the east coast and that his scientific results are important.

His programme as outlined in *Le Globe,* No. 1, 1912 (Geneva Geographical Society), was to cross from Holstenborg, in West Greenland to Angmagsalik on the east coast by a route considerably to the north of Nansen's. He expected to have three comrades, four sledges and twenty-five dogs and to set out on the journey about May 25. He hoped to reach Angmagsalik about Aug. 1 and return by steamer to Europe early in the fall.

Mr. Leffingwell's Plans. A letter from Ernest DeK. Leffingwell written at Flaxman Island, Alaska, dated May 20th, informs his family of his decision

XUM

to spend the winter in California and the East, returning in 1913 for another summer's work on the north coast of Alaska. The letter was not received until August.

MIKKELSEN'S RETURN FROM EAST GREENLAND. Captain Ejnar Mikkelsen and his companion, Engineer Iversen, have safely been returned to Denmark by the Norwegian fishing vessel Söblomsten which found them on the coast of East Greenland. They had been given up as lost. For more than a year they had lived chiefly upon the game they were able to kill. Mikkelsen reports that he found various records and the diary of Mylius Erichsen who, with his two companions Brönlund and Hagen, perished after completing the mapping of the unknown coast of northeast Greenland. This map was recovered and a description of it was printed in the *Bulletin* (Vol. 41, 1909, pp. 23-25), following an account of what was known of Mylius-Erichsen's great sledge journey (Vol. 40, 1908, pp. 553-4). Mikkelsen found on the coast of Denmark Fiord two cairns containing Erichsen's reports of discoveries, from which it would appear that Peary Channel does not extend from Robeson Channel to the Greenland Sea as has been represented on the maps. Mikkelsen and Iversen spent the past two winters, amid great privations, partly on Shannon Island and partly on Bass Rock Island.

POLITICAL STATUS OF SPITZBERGEN. The *Geographical Journal* (Vol. 39, 1912, No. 6, p. 617), announces that the conference on this subject between representatives of Russia, Sweden and Norway lately met at Christiania and agreed upon a convention according to which Spitzbergen will be a neutral territory open to all nations but administered by a joint board consisting of one representative of each of the contracting powers. Taxes are to be levied by the board but only with the approval of the respective governments.

CYCLONIC MOVEMENTS IN THE ARCTIC. A much-belated discussion of the movements of cyclones in the Arctic in the period September, 1882, to August, 1883, by Edouard Vincent, has appeared in the *Mémoires* of the *Academie royale de Belgique, Classe des Sciences* (II ser., tome III, 1910). The material used comprised the international polar observations of 1882 and 1883, together with those made at certain other permanent stations somewhat farther south. Using these data, the author has been able to construct synoptic daily pressure maps for the area within lat. 60° N. The interest in the history of our extra-tropical cyclones after they leave our own latitudes on their poleward journey naturally makes such a study as that of Vincent one of considerable importance. It appears from the charts that cyclones seldom travel beyond latitude 80° N. In two cases only within the period in question did they pass north of latitude 85°. Further, with increasing latitude the cyclones last a shorter time; they may be followed for three or four days, but hardly ever for seven or eight days, as is the case so frequently in lower latitudes. The pressure at the center of polar cyclones is never very low. The polar area is clearly not one of marked atmospheric disturbances. It has, as a matter of fact, been pretty clear for some years that the inner polar area, in both hemispheres, is beyond the region of the marked cyclonic disturbances of our own latitudes. The most recent expeditions in the Antarctic have confirmed this view. R. DEC. W.

THE JAPANESE ANTARCTIC EXPEDITION. The *Kainan Maru* under the command of Lieut. Shirase arrived at Yokohama on June 19 last. A preliminary report of its work in the Antarctic published in *Ostasiatischer Lloyd* 1912, No. 16 and 18, is reproduced in *Petermanns Mitteilungen*, Vol. 58, 1912, July, p. 34. It appears from this account that the stay of the party on the Antarctic continent was limited to four weeks. They landed in Whale Bay, Amundsen's winter quarters, on Jan. 16, this year, and four days later Shirase led a party into the interior which returned to Whale Bay on Feb. 1 after an absence of eleven days. Meanwhile Capt. Nomura took the *Kainan Maru* to the east as far as Biscoe Bay where he climbed Alexandra Peak. His farthest eastward position was in 150° W., 73° S. Meanwhile a sledge party under Takeda traveled to the southeast as far as 156°27′ W., 80°5′ S., where an altitude of 1,300 ft. was

reached. On Feb. 14, the Japanese vessel started on the homeward journey as the party had neither coal nor provisions for a longer stay. Lieut. Shirase is said to claim that he has proved that there is no connection between South Victoria Land and King Edward VII Land. As the work of Amundsen, Scott and Shackleton seems to have convinced those explorers of the strong probability that these lands are connected, Lieut. Shirase's opinion, may be regarded as speculative.

PERSONAL

DR. HENRYK ARCTOWSKI. The University of Lemberg, Austria, on the occasion of its 250th anniversary, conferred upon Henryk Arctowski, Chief of the Science Division, of the New York Public Library, the honorary degree of Doctor of Philosophy. Dr. Arctowski has an international reputation as a meteorologist and his attainments were especially brought to notice by his work as the meteorologist of the Belgian Antarctic Expedition. More recently he has been engaged in researches looking towards the prediction for some years in advance of weather and its effects on crops and food supply. His initial papers on this subject have appeared in the *Bulletin* of this Society and others are also in course of publication in the *Bulletin.*

PROF. ROLLIN D. SALISBURY. Prof. Salisbury head of the Department of Geography and Dean of the Ogden Graduate School of Science in the University of Chicago sailed recently for South America with Mr. Bailey Willis, C. E. of the U. S. Geological Survey. It was their purpose to cross the Isthmus of Panama, go down the west coast to Valparaiso, spend a few days on the west side of the Andes and then take the Trans-Andean R.R. for northern Argentina and Buenos Aires. About Oct. 1, Prof. Salisbury expects to camp in Patagonia at Lake Nahuel Huapi in the eastern Andes and later to inspect the iron deposits of Brazil.

OBITUARY

PROF. JOSÉ ARECHAVALETA. Prof. Arechavaleta, Director of the Museo de Historia Natural, Montevideo, Uruguay, died in that city on June 16 last at the age of 63 years. He was born at Bilbao, Spain.

DR. W J MCGEE. Dr. McGee, whose contributions to geology, anthropology and the conservation of natural resources made him widely known, died on Sept. 5, aged 59 years. In 1887–91 he made a geological and physiographical survey of northeastern Iowa, the most extensive ever carried out in America without public aid. His "Pleistocene History of Northeastern Iowa" was published in 1891. Later he became attached to the U. S. Geological Survey, had charge of the surveying and mapping of 300,000 square miles in the southeastern part of the country, investigated the Charleston earthquake in 1886, served as ethnologist in charge of the Bureau of American Ethnology in 1893-1903 and held other important positions. He was distinguished as a lecturer and a writer and many of his scientific memoirs and over 300 minor articles were published by the Government.

GENERAL

THE XIITH INTERNATIONAL CONGRESS OF GEOLOGY. The International Geological Congress, on the joint invitation of the Government of Canada, the Provincial Governments, the Department of Mines, and the Canadian Mining Institute will hold its twelfth meeting in Canada during the summer of 1913, under the honorary presidency of H. R. H. the Duke of Connaught, Governor General of the Dominion of Canada. The Executive Committee consists of the following gentlemen:

President.—Frank D. Adams, D.Sc., F.R.S., Dean of the Faculty of Applied Science and Logan Professor of Geology, McGill University, Montreal.

XUM

General Secretary.—R. W. Brock, M.A., F.R.S.G., Director of the Geological Survey of Canada, Ottawa.

Members.—Alfred E. Barlow, D.Sc., F.R.G.S., McGill University, Montreal; A. P. Coleman, Ph.D., F.R.S., Professor of Geology, University of Toronto; Théo. C. Denis, B.A. Sc., Superintendent of Mines for the Province of Quebec, Quebec; O. E. Leroy, B.A., M.Sc., Geological Survey, Ottawa; G. G. S. Lindsey, B.A., K.C., 27 Manning Arcade, Toronto; William McInnes, B.A., Geological Survey, Ottawa; Willet C. Miller, LL.D., F.R.S.G., Geologist for the province of Ontario, Toronto; W. A. Parks, B.A., Ph.D., Department of Geology, University of Toronto, Toronto; J. B. Tyrrell, M.A., F.R.S.G., 534 Confederation Life Building, Toronto.

Secretary.—W. Stanley Lecky, A. R. S. M., Victoria Memorial Museum, Ottawa.

The following topics have been selected by the Committee as the principal subjects for discussion:

1. The coal resources of the world.
2. Differentiation in igneous magmas.
3. The influence of depth on the character of metalliferous deposits.
4. The origin and extent of the pre-Cambrian sedimentaries.
5. The sub-divisions, correlation and terminology of the pre-Cambrian.
6. To what extent was the Ice Age broken by interglacial periods?
7. The physical and faunal characteristics of the Palaeozoic seas with reference to the value of the recurrence of seas in establishing geologic systems.

It is proposed to hold the meeting of the Congress in Toronto, beginning on or about August 21. The Congress will continue in session for eight days. Arrangements have been made for a series of excursions which will enable the members of the Congress to gain a knowledge of the geology and physiography as well as the mineral and other natural resources of Canada. These excursions will take place before and after the meeting of the Congress. Members will have the opportunity of participating in one or more of the longer, in addition to several of the shorter, excursions.

Wind-blown Trees. Some very remarkable photographs of wind-blown trees are reproduced in a recent article by Dr. Oscar Burchard, director of the German meteorological station at Puerto de Orotava, on the island of Teneriffe (*Met. Zeitschr.*, Vo. XXIX, 1912, p. i). The trees are very old (*Juniperus phoenicea* L.), and are wind-blown to such an extent that they are actually prostrate on the ground. The direction in which they lie is about N. 67° E. Dr. Burchard rightly concludes that this direction is the resultant of the variations of the northeast trade during the long period during which the trees have been growing. Observations of wind-blown trees might very profitably be made by travelers in little-known regions. The prevailing wind direction, or it may be the direction of the strongest winds, which is often permanently recorded in the direction shown by the trees, is a climatic element of great value. R. DeC. W.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

AMERICA

The Climate of Ohio. By J. Warren Smith. *Bull. 235. Ohio Agric. Experiment Station*, Wooster, O., 1912. Pp. 185–209.

This is a short report, consisting of five pages of text, nine tables and fourteen charts. These charts show the mean annual temperatures, dates of killing frosts, average number of days in the crop-growing season, mean annual and seasonal precipitation, mean annual snowfall, and monthly distribution of precipitation. There are also given curves showing the mean annual temperatures for Ohio for each year from 1883 to 1910, and the mean annual precipitation from 1854 to 1910. The *Bulletin* gives, in compact form, the essential climatic characteristics of the State. R. DEC. WARD.

Geology and Ore Deposits of the Butte District, Montana. By Walter Harvey Weed. 262 pp. Maps, ills. *Prof. Paper* 74, *U. S. Geol. Surv.* 1912.

Apart from its technical value, this Professional Paper contains valuable data of geographic interest on the central tract of the mountainous portion of the State of Montana. This area is partly represented on the geological map shown on Plate I.

A résumé of the physiography of the Butte district precedes its detailed geological review. The formation of the veins is ascribed to the hydrothermal alteration of the rock by metasomatic replacement which also contributed to the mineralization of the wall-rock to a slight degree. As to the source of the copper and the other metals of the quartz-pyrite veins, it is believed, although the evidence is not conclusive, that they are derived from emanations originating in a deep-seated magma. Mineralization is also shown to have been influenced by the process of secondary enrichment.

The author arrives at the conclusion that the output of the district will remain constant for some years to come and will then gradually decline. It is, of course, possible that improved methods of treatment will make pay ore of what is now called waste. The zinc ores also promise to be of great value and to add both to the material wealth and the productive period of the district. The question of ore reserves draws attention to the ephemeral life of all mining communities depending on the yield of their subsoil for their existence as geographic entities.

The main criticism of this work is to be directed against the publishers. We refer to the delay involved in the publication of Mr. Weed's results. The litigation which was in progress at the site of the mines described, ought under no circumstance to have been the cause of the temporary shelving of data of scientific and economic value. LEON DOMINIAN.

Alberta. An Account of Its Wealth and Progress. By Leo Thwaite. Porter's Progress of Nations. 250 pp. Maps, ills. George Routledge & Sons, Ltd., London, 1912. 50 cents. 8 x 5.

This Canadian Province, which has been receiving so much attention as a new agricultural land and an outlet for our own population is here attractively described. The author sketches briefly the history, constitution, and government of the province; more fully, its physical characteristics, topography, resources,

soils and water-ways; its rapid development in population, industries, and communications; its cities and towns, education, finance and trade; and finally gives us a glimpse of its possible future as forecasted in its past and present.

Along its western border Alberta has the Rocky Mountains, but over 80 per cent. of its surface is undulating prairie and high plains. The plains, in a very youthful stage of dissection, are crossed from the mountains eastward by tributaries of the Peace, Athabasca and Saskatchewan rivers lying in deep valleys and uniting in these large rivers in mid-country. Between the valleys lie the plateau strips, usually with deep, rich, black soils superior to the black earth of Russia, and with a rather meager supply of water, though most of the precipitation occurs in the growing season. The stratigraphy with its coal, gas, oil, gypsum, salt and clays is much like that of the Dakotas. Irrigation is possible only near the mountains. Water-power is abundant down the valleys. Alberta is believed to have enormous horse-power. Lakes are numerous, and twenty-five are of large size. Fishing in both lakes and streams is excellent. One is surprised at the development already attained. G. D. HUBBARD.

The Selkirk Mountains. A Guide for Mountain Pilgrims and Climbers. By A. O. Wheeler and Elizabeth Parker. x and 199 pp. Maps, ills., appendix, index. Stovel Co., Winnipeg, Canada, 1912. $1.50. 5 x 7½.

This handy little volume presents in compact and readable form a large amount of information which the casual tourist as well as the more ambitious traveler will be glad to have. Opening with a sketch of the early exploration and mountaineering which are brought down to 1911 by an outline of subsequent work, the text next takes up various districts in detail and concludes with brief descriptions of the geology, flora and fauna and related matters. There are also sections on the Alpine Club of Canada and on rules, equipment, etc., for mountaineers.

The two principal chapters are devoted to the summit range contiguous to Glacier and to the Purcell Range and the country about the headwaters of the Columbia River. The latter, being new, is of especial value. In the former, the various orographical features are described alphabetically, full data as to times, distance, altitude, origin of name, location and routes of approach being set forth under each. Inasmuch as this section will be put into practical use by many of its readers, it is disappointing to discover a goodly number of minor slips and contradictions. Space forbids citation of these, but some of the more glaring errors of fact follow: Professor Parker did not climb Grand Mt. (p. 67); Purity Pass (p. 85) is not connected with Purity Glacier, nor is its altitude 9,200 feet, but 8,700 feet; Terminal Peak (p. 98) agrees in neither position nor altitude with the same as mapped; Mt. Sugarloaf cannot be climbed as described under Route 2 (p. 96); Mt. Sir Sandford was first attempted in 1907, not in 1908 (pp. 30 and 94) and not by the party mentioned; Ross Peak Station (p. 90) is too high by over 800 feet, and Beaver Creek Station (p. 49) does not exist.

Passing elsewhere, the following observations are suggested: The Columbia River flows northerly from Columbia Lake for about 175 miles, not 300 miles (p. 10). The author will find few supporters for the statement (p. 150) that heat and cold, contraction and expansion, cause large crevasses in glaciers. Porcupines, squirrels and eagles are common, pages 174 and 176 to the contrary notwithstanding.

Fifty-nine illustrations and six maps are presented. Of the former, Eagle Peak is mislabelled Mt. Avalanche (p. 34), and Mt. Purity is seen from the Bishop's Range (p. 84), not from Donkin Pass. The Cougar Brook view (p. 114) should be inverted. H. PALMER.

South American Problems. By Robert E. Speer. xi and 270 pp. Map, ills., index. Student Volunteer Movement for Foreign Missions, New York, 1912. 7½ x 5.

A singularly sober and well-considered book. Mr. Speer keeps himself in the background, but he seems to have visited every country except perhaps Venezuela, Ecuador and Paraguay and his judgments carry evidence of con-

stant, careful examination of the facts. After quoting Barrett, for instance, for boom statistics of the magnificent areas of the Latin Republics, he adds (p. 35) "It is customary to speak with unlimited wonder of the wealth and resources of South America. It is not to be doubted that the continent has immense riches of agricultural product and mineral treasures waiting to be developed, but the general impression produced upon the observant visitor is disappointing. There are deserts more barren than the worst of ours. The tropical forests and vegetation are coarse and oppressive. The rain and warmth produce luxuriant growths, but tender things, green grass and little flowers die in the shadows or are scorched in the heat. The table land of the Andes above the timber line and with too high an altitude for corn and wheat, the rainless stretches of arid soil, the sandy wastes even in the tropics, the swamps and miasmic forests, must all be measured when we talk of the agricultural possibilities of South America."

Mr. Speer perceives the vast wealth of the Argentine Republic. That country "is in a class by itself" (p. 36). He puts Brazil and Chile next in energy and progressiveness and places at the bottom "of the South American countries that we saw" Peru, Colombia and Bolivia (p. 55). The present writer does not know any brief sketch of the South Americans so sound and illuminating as this. It makes no pretence to be scientific geography. His object was to estimate the call that exists for Protestant Missions in these regions and his book must efface any doubt on the subject. His treatment of the Catholic church of the Latin continent is admirable for its reserve as well as its soundness. He quotes from Hale that in the southern continent "male chastity is unknown" and he might have added "Nor believed to exist anywhere." Immorality is a cancer on southern culture. It is a taint on their physical as well as their spiritual nature.

MARK JEFFERSON.

Chile. An Account of its Wealth and Progress. By Julio Perez Canto. Porter's Progress of Nations. 251 pp. Maps, index. George Routledge & Sons, Ltd., London, 1912. 1s. 8 x 5.

About one-third of the volume is given over to an introduction by Robert P. Porter, the object of which is to present a brief account of the early history of Chile leading up to the "modern industrial Chile to which Mr. Perez Canto has been obliged to devote most of his space." Because of the fact that the book is written to supply "immigrants and investors with trustworthy information," it seems that the introduction could have been omitted. The second part handles the necessary information admirably, leaving one with the impression that Chile is a land of golden opportunity. The arguments are not always fully consistent, as shown by the statement in Chapter II to the effect that the "backbone of the nation is the agriculturist" and by the climax statement in the closing chapter, "the future of Chile does not rest merely upon the material advantages . . . ; it is securely based upon the intense patriotism of the inhabitants."

The significance of the Panama Canal as a factor in the future of Chile is evidently left for Mr. Canto to emphasize. After stating how geographical location has handicapped large immigration from Europe especially, he says "the Transandine Railway to Buenos Aires has already commenced to exercise a favorable influence, while the Panama Canal will soon do the same on a vaster scale."

The reader is left with the impression that Chile lacks little in modernism; that its resources are still in large part undeveloped; that its products, both mineral and agricultural, occur in large variety, and that the possibilities of the area for the pursuit of manufacturing industries is fairly unlimited. Potential water power from the swift mountain streams, thick seams of coal deposits, and iron deposits which are "fabulous" promise a brilliant future.

The statistics which are well woven into the chapters on "Navigation," "Trade and Commerce" and "Mining and Metallurgy" are of considerable interest. Authorities, always desirable in connection with data, are not always cited.

A political map of Chile on a scale of approximately 145 miles to the inch folds into the book as an insert and upon the back cover appears a political map of South America on a scale of approximately 753 miles to the inch.

EUGENE VAN CLEEF.

XUM

AFRICA

History and Ethnography of Africa South of the Zambesi. From the Settlement of the Portuguese at Sofala in September, 1505, to the Conquest of the Cape Colony by the British in September, 1795. By George McCall Theal. Vol. I, from 1505 to 1700, xxii and 501 pp. Vol. II, Foundation of the Cape Colony by the Dutch, xix and 523 pp. Vol. III, The Cape Colony to 1795, the Koranas, Bantu, and Portuguese in South Africa to 1800, xiii and 499 pp. Index. Maps, ills. in each. Swan, Sonnenschein & Co., Ltd., London, 1909–10. 8½ x 5½.

This is by far the most satisfying, as it is the most pretentious, work upon the colonization history of the land which Vasco da Gama established as the last and overcome obstacle in the path of the fleets to the Indies, the age-long goal of all commerce, the stimulus to all geography. Portugal, the United Provinces, last of all Great Britain, each has had its share in establishing a new world in the south. These three volumes present the record of that activity during the 290 years from the discovery down to the acquisition of the Cape Colony by the British in 1795. In the preparation of this great task Dr. Theal has had the advantages of his long career as keeper of the archives of the colony and as the officially appointed writer of its history.

We are too little inclined to give attention to the marvelous growth of the British Empire, that group of English republics all around the world bound together by the idea of loyalty to the throne, the Dominion of Canada, the Commonwealth of Australia, newest of all the Union of South Africa. Here we have a true republic, self-administrative because wholly self-supporting, which has assumed the burden of development of the whole temperate region of the African continent, an interesting contrast with the Latin communities which face it across the Atlantic in South America. Surely this is a land worthy of the historian. But not yet. The Parkman of South Africa has yet to come, the historian who shall tell the tale of the white man and the black, with abhorrence of savage blood-thirst and with equal scorn of the white invader living in pioneer violence and shabby double-dealing. And Dr. Theal is not so much historian as historiographer.

Yet these volumes are not without interest. We do not know where to turn with the hope of finding even a half of the information here set forth, much of it now for the first time made public. We should be puzzled to discover an equal record of the documentary history of the successive shifts of empire at the Cape and in the lands thereto adjacent. For the narrative of the life of the black whom the first settlers found there and whom they harried and by whom they were scourged until the quite modern days when white might proved itself, as always, white right, for the record of the Bushman, the Hottentot and the free Bantu tribes we know not where else to turn for such rich reward. Should this comment seem to deny this work a position in the first flight of written history it might prove difficult to cite chapter and verse for the impression which the reading of these volumes has produced. Perhaps the opinion may be found to rest upon the possession of what, in default of a particular designation in the terminology of criticism, we may denominate the complacency of the historian. It shows itself in the feeling that the white settler could do more for the land than the black autochthon, that as between the Portuguese discoverer and the Dutch intruder the possession of blood allied to the Anglo-Saxon vital juice made in general for righteousness, that the coming of the British was the satisfaction of the law. Yet we are to recall that the composition of fierce struggles is now less than a dozen years old, the policies of the time of disturbance have not yet passed from mind. WILLIAM CHURCHILL.

Sahara Soudanais. Tome II. Par R. Chudeau. Missions au Sahara. Par E. F. Gautier et R. Chudeau. iv and 326 pp. Maps, ills., index. Armand Colin, Paris, 1909. 15 frs. 10 x 6½.

The second volume of this great work, which has been recognized by a prize from the French Academy of Science, deals with the central and southern

Sahara, Gautier having described in the first volume the Algerian or northern Sahara. The two volumes at present form the best and most reliable treatise on the great African desert, which seemed heretofore to many a region of absolute barrenness and desolation. According to Chudeau, the central and southern Sahara represent a peneplain of Silurian age, being for the greater part uninhabitable, sterile and desolate. The high region of the desert, especially to the southwest of the oasis Titikelt is called Tanezruft, a name given to the desert by the Tuaregs. The Tanezruft is characterized by great irregularity of rainfall, which may be entirely absent for many years, thus offering few or no watering-places for caravan trade. Chudeau gives a vivid description of the different districts and principal places of the central and southern Sahara, such as Aïr, Adrar and Ahaggar, as also of the various Tuareg tribes inhabiting them, the fauna and flora, and the hydrographic and meteorologic conditions. The southern limit of the desert flora corresponds with the northern limit of the regular tropical rains, while in the desert proper only occasionally heavy showers occur, which are more harmful than useful. Cultivated gardens, which are near to the salt-bearing strata, are completely destroyed for years by the salt that overflows them with the rain. Hailstorms occur occasionally. Chudeau mentions also the "dry mists" of the southern desert, which may become so dense that even a camel cannot be seen ten feet away and which cause impenetrable darkness at night. These dry mists of dust indicate to the inhabitants of the desert that in the Sudan the rainy season has set in, because the storm winds which bring the rain in the Sudan are whirling, in the southern part of the desert at least, dust and fine sand. In the "zone sahélienne," the southern boundary of the desert, the desert flora dies out; here also salt plants are absent, so that the camels must have rations of salt instead of finding it. The wind erosion is, according to Chudeau, not progressive in a southerly direction and there is evidence that the desert even retreats from the Sudan northward.

In regard to the commerce of the Sahara and the project of building a transsaharan railroad Chudeau strongly opposes such an undertaking. The transsaharan commerce, he says, is too unimportant to warrant the buliding of a railroad. The small commerce of the interior tribes in salt and garden products, which supply the needs of the natives, would incur a heavy decline in the salt by the building of a railroad, especially at the Senegal and Niger. The railroad would bring foreign salt. Besides, it is a fact that commerce, especially in the western part of the desert, is practically dead. Only the caravan-routes from Zinder and from Lake Chad to the north have little hope of existence for a few more years. The population is slowly decreasing.

CHARLES L. HENNING.

Anthropological Report on the Edo-Speaking Peoples of Nigeria. By Northcote W. Thomas. Part I: Law and Custom; 163 pp., map. Part II: Linguistics; 251 pp. Harrison & Sons, London, 1910. 9 x 5½, each.

This is of the nature of a preliminary report, but when we bear in mind that hitherto nothing has been known of these important people in central Nigeria the sense of the richness here set forth quite obliterates the feeling that this is but a partial statment. Yet Mr. Thomas is very careful to indicate where ceases his precise knowledge and to point out what he considers to be the most promising line of inquiry for further study, whether by himself or by others interested in the life of that community. His work is most complete along the lines of the systems of relationship and vocabulary; in fact, the second volume of the report is wholly given over to texts of Edo narratives and to brief dictionaries of that and other languages associated therewith in the same territory.

WILLIAM CHURCHILL.

La Mission Cottes au Sud-Cameroun (1905–1908). Par le Capitaine A. Cottes. Préface par André Tardieu. xv and 254 pp. Maps, ills. Ernest Leroux, Paris, 1911. 11 x 7½.

It is unfortunate that after the delimiting mission of Captain Cottes had been

brilliantly accomplished the results should have been caught within the nexus of the higher diplomacy, that their publication should have been delayed for several years, and that this alert young officer, after displaying a genius for field work in geography, should have been condemned to rust in garrison. The field of his labor was in the southern tier of the Kamerun, the immediately adjacent northern tier of Gabun, and he also presents a summary sketch of the Spanish territory of Guinea, which marches with the two larger territories upon their Atlantic face. The geographical results of this survey are stated with delightful precision. It was really a task of running lines and of setting monuments. Incident thereto the field notes detail with panoramic precision the essential nature of the whole terrain traversed, we thus have from this survey a very full account of the principal line extending irregularly north and south of the second parallel of north latitude from 9° East almost to 14° East, where this line terminates on the bank of the River Sangha; to which is added a similar reconnaissance of the three landward boundaries of Spanish Guinea, the whole supplemented by several considerable excursions through hitherto unexplored territory. The accompanying papers go quite extensively into the anthropology of the region, less enthusiastically into the ethnography and linguistics, and touch lightly but accurately upon the collections in natural history.

WILLIAM CHURCHILL.

ASIA

From Constantinople to the Home of Omar Khayyam. Travels in Transcaucasia and Northern Persia for Historic and Literary Research. By A. V. Williams Jackson, xxxiii and 316 pp. Map, ills., index. Macmillan Co., New York, 1911. $3.50. 9 x 6½.

To have produced page after page of accurate notes of travel, accompanied by historical sketches and enlivened by comment born of cultured thought, is the task of which the author has acquitted himself with credit. The reader's interest is awakened from the first by the transition from Occidental to Oriental life plainly discernible in the Turkish capital. Professor Jackson's sojourn on the shores of the Bosphorus must have been brief, however. Else why should he have need to quote Pliny either on the possibility of persons conversing with each other from bank to bank, or on dogs being heard barking or birds singing across the straits.

The first part of the journey was made through that portion of Russian territory which is peopled mostly by Mohammedans. The numerous architectural monuments inspired by the genius of this creed are described with much minuteness. In Baku the blending of the old and new is laid before the reader's eyes in the shifting scenes evoked by modern industry thriving on the site of vanished splendor. The technical reader might possibly be disappointed with the account of the activity prevailing at the world-renowned oil-fields. The general reader, however, will derive all the information of use to him. On the whole, it is the scholar who will be especially interested by the contrasts between the spirit of modernism revealed by the forest of derricks raised near the now abandoned shrines of the ancient fire-worshippers, whose Hindu origin is sustained by the author in lieu of its more generally ascribed Persian genesis. Beyond and towards the north, historic Derbent is pictured as it now stands, shorn of its former strategic importance.

Over the Caspian Sea and as the reader is led into northern Persia, the narrative teems with facts proving the restless activity displayed by the Russians in their steady endeavor to gain access to an ice-free harbor by absorbing the land of the Persian. The author's route coincided with or skirted Alexander the Great's tracks. The changes occurring along these ancient highways from the time they were overrun by Persian cohorts to the modern days of Persian supremacy, and then again to the period of present decadence, flit through the mind in kaleidoscopic sweeps of vision that add much zest to further research.

A note of sadness enters into the account of the pilgrimage to Omar Khayyam's grave. Devotees of the poet-philosopher will learn with regret what

little remembrance of his versatile genius now lives in the minds of the descendants of his townsmen.

The spelling of Oriental names and words will probably be found incorrect by those whose vernacular is either Persian, Arabic or Turkish. If the author's intention has been to retain the native pronunciation, we fail to see why the forms "Muhammad, amrud, shahr, beg, Nasir ad-Din," and so on, in endless succession, should have been used instead of the indigenous versions of "Mohammed, armud, shehir, bey, Nassreddin." They smack of sixteenth and seventeenth century travelers' indifference to accuracy which has been dispelled by modern Oriental studies. While no such negligence can be imputed in the present case, on account of the consistency in the forms adopted, the departure from the original pronunciation leads one to wonder at its cause.

A glimpse of Persia at play with its liberal form of government is also obtained by the perusal of the text. It may be said that a large share of the book's value lies in the description of this country as the author saw it in its present state. Much of the historical information crowded in the text exists in the works of earlier travelers. Our thanks are due to Professor Jackson for correcting in many instances the errors of his predecessors as well as for the new material picked up along the less-known sections of his route. The large number of photographs contribute materially to increase our knowledge of the regions he has visited. LEON DOMINIAN.

Landes- und Volkskunde Palästinas. Von Dr. Gustav Hölscher. Sammlung Göschen. 168 pp. Map, ills., index. G. J. Göschen, Leipzig, 1907. 80 pfg. 6 x 4.

This little hand-book remains one of the most reliable and useful descriptions of the Palestine of to-day. Especially useful is its analysis of the topography of this historic land and its description of the present inhabitants. Unfortunately, it lacks a suitable map equipment. The one map* provided is so congested with names that it is almost useless. Travelers in Palestine will find the information compacted in this little volume of great service. It is a worthy companion of the other volumes in the same series.

CHARLES F. KENT.

Die indischen Grosstädte. Von Dr. Karl Goës. Statist. und National-ökonomische Abhandl., Heft 7. 93 pp. Tabellen. Ernst Reinhardt, München, 1910. Mk. 5. 10½ x 7½.

Pamphlet in form and ancillary to the census returns of the British Government in India, the care with which these statistics have been compiled for comparison enables the author to point out clearly an interesting detail of the method of imperial government in the peninsula of India. There is nothing in the history of British India from the days of the Honorable East India Company to the present administration to suggest that the British have been guided by a theory of government, that they have ever been other than haphazard in their methods. But in capable hands these figures are made to show that a power which not even slipshod administration could override has been leading Great Britain surely in the direction of the economic conquest of India, a matter far other than the mere political conquest which has cost such treasure of blood and gold. In these tables the author shows how the industrial and social conquest is working itself out in the great cities of Calcutta, Bombay, Madras and others of less note. WILLIAM CHURCHILL.

La Grande Artère de la Chine. Le Yangtseu. Par Joseph Dautremer. 304 pp. Ills., map, index. E. Guilmoto, Paris, 1911. Fr. 6. 9 x 5½.

This book is not a study in potamology but a "Länderkunde" of the provinces of China which are watered by the Yangtse River and its tributaries. The first chapter describes the river itself; it is followed by several chapters on China as a whole, describing the origin and character of the Chinese, their

* Listed under "Turkey in Asia" (second entry) in *Bull.*, Vol. 44, No. 4, April, 1912, p. 319.

XUM

dwellings, food, domestic habits and customs, religion and superstitions, games and pastimes, and social classifications; also the commerce and products of China in general, its administration, currency system, weights and measures.

The special chapters deal, each, with an individual province as a unit whose natural conditions, economic status and possibilities are studied from geographical and economical or political points of view. The great colonial problems are placed in the foreground, and special attention is paid to the question why France does not in the Far East occupy a position which would correspond to its importance in Europe as one of the competing powers. One of the principal causes of this discrepancy, according to the author, is a certain lack of enterprise and persistency in the French character. The French are valiant conquerors, but they lack the qualities which make successful colonists. In Shanghai, for instance, the American and English quarters are hustling markets, abodes of live, business men; the French one is a quiet and dignified administrative center, the home of a number of functionaries. Moreover, the petty avarice of the average middle-class Frenchman, while it makes thousands of small capitalists in France, proves fatal abroad, where broadmindedness, initiative, and enterprise alone can make a man or a nation successful. It is owing to this parsimony that French firms, as a rule, do not maintain agencies abroad, nor advertise properly, nor offer free samples, nor encourage their clerks to learn the language of their customers, as the competing nations do. The result is that French imports into China have decreased considerably in proportion as those of Germany, America, and Japan have increased, so that silk ribbons are now the only article of which France still holds a certain monopoly.

The influence of Japan, especially, is increasing by leaps and bounds, and not along commercial lines only. The Chinese press is largely in the hands of Japanese agents. Most of its literature, even when of European origin, comes from the same source: in the library of a distinguished Chinese scholar, for instance, the author found Montesquieu's "Esprit des Lois," Rousseau's "Contrat Social," and Karl Marx's works, in Japanese editions, published in Japan for the use of the Chinese. Under these circumstances one cannot wonder at the recent political changes, although the author himself did not expect them to take place so soon. He witnessed, however, the first manifestation of a united modern China—the Nankin Exposition of 1910. While it was not much heard of abroad—being indeed not much more than a huge county fair of products of the Yangtse valley—it was nevertheless gotten up in direct imitation of Western models, under Japanese influence, and it marked an epoch in the development of China. It was not only because on this occasion the gorgeously dressed mandarins were seen, for the first time in Chinese history, officiating side by side with the reformers in black frock coats at its solemn opening—similar incongruities could be seen almost everywhere in the exposition—but because this assemblage, in the old Ming capital, of products from every part of the country, and the gathering together of people from every corner of it, meant the first concerted action of modern Chinese thought and feeling, which has since worked such astonishing revolutions. As a study of the most important part of China immediately before the revolution, the book is very interesting geographically and economically. MARTHA KRUG GENTHE.

British-India. 1600-1828. (The English People Overseas, Vol. II). By A. Wyatt Tilby. 286 pp. Constable & Co., Ltd., London, 1911. 4s. 6d. 8 x 5½

This work is the story of the inception of British rule in the great peninsula, the resistance of the metropolis to the imperial idea and the stress of circumstances which made a company of merchants in Leadenhall street masters, always reluctant and always incapable, of the destinies of millions. By adopting the artificial limit of 1828, the year of the last Maratha war, as the end of this study we are left with imperialism still in the struggle, the Honorable East India Company is still in the course of that almost divine system of blundering, for it seems impossible that mere men could make such errors, which led to the Mutiny and out of it to the establishment of acknowledged empire. Histories of British India we have in abundance, but this is in a class by itself. It is

invaluable for the study of the growth of the imperial idea, whose problems Great Britain is as yet far from having settled on a scientific base.

This work is of great value as a corrective to that history of India which is written in terms of war and victories. It shows how empire was forced upon a trading nation without thought of glory, how little prepared they were for its responsibilities, how little even at the present day, and in far greater case ourselves, fall short of a reasonable scheme of administration.

WILLIAM CHURCHILL.

The Irrigation of Mesopotamia. By Sir W. Willcocks. 136 pp. 46 plans and maps in portfolio. E. & F. N. Spon, Ltd., London, 1911. 10½ x 7.

It is likely that the engineers on Sir William Willcocks's staff little realized at the outset of their operations how hampered they were to be in their field work. That they were able to cope successfully with the obstacles met is amply proven by this book, which is primarily an exemplary technical report. Viewed from the irrigation engineer's standpoint, its thoroughness reflects credit on its compilers. Some of the data it contains, such as costs of materials, wages, and transportation rates, will doubtless be of value to others than those who are interested in the vast irrigation scheme considered. The gain accruing to science from the industrial information afforded by its text is by no means slight. Sections of it taken together, form a veritable preliminary contribution to our knowledge of Mesopotamian hydrography.

The report has a cartographic importance of particular interest. The Mesopotamia with which it deals is "the true delta of the rivers Euphrates and Tigris, and comprises the country traversed by the two rivers and their branches southwards of Hitt, on the Euphrates, and Samarra, on the Tigris." No complete map of this region exists so far, no levelling having been undertaken before the advent of Sir William Willcocks's assistants. The work of the party's surveyors, as reflected in their maps therefore provides new material which can be made available for the compilation of a regional map. It is to be regretted that owing to the limited time at the disposal of the engineering parties, no triangulation points could be established. The joint achievement of the four survey parties has resulted in the preparation of sections of the first 1:50,000 map of the delta on which elevations are referred to mean sea level, the determination of which was obtained at Khor Abdallah, south of Basra, on two consecutive days. The traverses (plane table, tacheometer and magnetic needle) run down the Tigris and Euphrates and the center of the country, added to the cross-traverses between the two rivers, will permit plotting of geographic units with a greater degree of accuracy than has been hitherto attained.

A mere perusal of the book suffices to reveal the fact that considerations of a geographic nature, as such, were not foremost in the mind of its several contributors. Nevertheless, it often happens that the geographer is enabled to add to his store of information by having recourse to the results obtained by trained men of the type present in Sir William Willcocks's parties. An excellent instance in point is that of appendices C and F dealing with the agricultural possibilities of Mesopotamia. Both contain material of value. The contents of appendices D and E will likewise appeal to the student of climatology despite their brevity. A note of human interest is awakened by this report on the present effort to reclaim this region's former economic importance.

LEON DOMINIAN.

EUROPE

Edinburgh Revisited. By James Bone. Drawings by Hanslip Fletcher. viii and 263 pp. Ills. J. B. Lippincott Co., Philadelphia, 1911. $5. 11½ x 9.

A particular surprise awaits the reader of this volume. Certainly it does bear the outward guise of an ornamental book, a parlor table luxury; yet it is necessary to read but a few pages at random to discover that the author had a worthy purpose and that he has carried it out with careful attention, that the work of the draughtsman is narrowly held to the same theme, and it must be confessed that the subjugation of the illustrator is the greatest victory of the

author. With the acute perception of the trained builder, Mr. Bone has been prowling in the dark rooms of old Edinburgh, back in the wynds, up the dark stairs of many lands now given over to the poor but holding still in their shabby estate the remnant of the ornament which once was decoration for earl and parliament man and fine lady of the court. He has written in intimate detail a most agreeable record of much that few who live all their days in Edinburgh have ever seen. WILLIAM CHURCHILL.

ANTHROPOLOGY

Ancient Hunters, and their modern Representatives. By W. J. Sollas. xvi and 416 pp. Maps, ills., index. Macmillan & Co., Ltd., London, 1911. $4. 9 x 6.

Studies in prehistoric anthropology have been accelerated, during the last few years, by the discovery of a number of skeletal remains of man. This book is an account of these findings which have modified the theory of the antiquity of the human race. The story is presented in a vivid way with the aid of an ingenious comparison of the ancient dwellers of the earth with their modern representatives. The real discussion opens with a chapter on the extinct Tasmanians which the author asserts were a Paleolithic or even an earlier race, although they lived recently. The Lower Paleolithic conditions include the Mesvinian, Strepyan, Chellan and the Acheulean stages of culture and a brief description of these introduces the readers to the most ancient hunters.

The record of the Mousterians of the Mid-paleolithic is more complete. The story is told of the Australian aborigines, "the Mousterians of the Antipodes." "If, as we have supposed, the Tasmanians were driven out of Australia by a Paleolithic race, now represented by the Australians, it is evident that the two most divergent sub-divisions of the human family, that is, the Cymotrichi (wavy haired) and the Ulotrichi (twisted haired) were already in existence at a very early date." In the treatment of the Upper Paleolithic, the Aurignacian stage is described by citing the history of many stations in Europe. The introduction of the art of expression by pictures forms an interesting phase of this age. The modern representatives of the Aurignacians are the Bushmen. The Magdalenian man, the next in order, seems to have been the ancient representative of the Eskimo, a dweller on a tundra which bordered a cold ocean, and the comparison between these two races so far apart as to time and so near as to accomplishments and customs is a fascinating study. Introductory to all this history the author describes the Great Ice Age; and the division of time into eight ages, four glacial which mark the advances of the ice and four genial which mark its retreats, provides him with a chronological scale to which the events of the early history are referred. The chronology is attempted in the last chapter. The author admits no positive evidence of the existence of man preceding the Pleistocene. The book contains many illustrations and is a very instructive survey of prehistorical archæology. ROBERT M. BROWN.

Kulturelemente der Menschheit. Anfänge und Urformen der materiellen Kultur. Von Dr. Karl Weule. 94 pp. Ills. Kosmos Gesellschaft der Naturfreunde. Franckh'sche Verlagshandlung, Stuttgart, 1910. Mk. 1.80. 8½ x 5.

Within such narrow compass this little volume can pretend to no higher estate than that of a primer introductory to the great and rapidly growing science of the comprehension of primitive man. But as primer it is interesting to set it in comparison with a series of similar primers in English now appearing under high university sanction. Of this series it has been said that each primer is so accurate and at the same time so condensed as to be quite beyond the powers of any but the leaders of the science. This German primer, on the other hand, in common with at least ten others produced under the sanction of the Kosmos Society of Stuttgart, is essentially narrative. The purpose of each, in strong contradistinction from the English model of the science primer, is expressly to present an interesting story of the science in such simple form as

shall attract the attention of the reader, to give him to understand what a worthy theme awaits his future study in case he shall so elect. In such presentation there is necessarily nothing that is new, essentially there is no place for the controversial topics. Even should the reader go no further than this plain presentation of the objects of study in the life of early societies, we can see how such a primer would make for the betterment of general knowledge.

WILLIAM CHURCHILL.

ECONOMIC GEOGRAPHY

The American Transportation Question. By Samuel O. Dunn. xi and 290 pp. Index. D. Appleton & Co., New York, 1912. $1.50. 7½ x 5.

This collection of articles and lectures by Mr. Dunn is a timely contribution on the economics of railroad operation in the United States. The author correctly assumes the cost and the value of the carrier's service to be fundamental principles of ratemaking. These factors are not considered from the standpoint of abstract theory but as deductions of concrete investigations of railroad management in the United States.

The statistics given in two chapters on efficiency are instructive. The lower rate of the cost of construction per mile of railroads in the United States as compared with European railroads, as well as the lower capitalization per mile of track in this country, reveal the relatively advanced stage of railroad management in the United States. With regard to the relation of efficiency to economy or to public service the data used have been culled from all over the world. Mr. Dunn deserves credit for assembling these figures, which speak well again in favor of American roads.

As regards the dissimilarity of conditions in the old and new world, the author seems not to concede enough importance to the fact that, while European roads are generally planned to meet the requirements of transportation, American roads are often, on the other hand, built to create traffic. The significance of the resulting geographic problems is plain to all who have travelled in our West, where the laying of tracks has contributed in more than one instance to the peopling of barren expanses.

Some interesting facts in economic geography may be gleaned from the chapter on railroads and inland waterways. The impression conveyed is that of a decided bias in favor of the latter. True, it is shown that arguments based on the economic development of waterways in Europe cannot be made to apply conclusively to conditions in the United States, where railroad transportation rates are almost as low as the usual European canal or river rates. At the same time, the importance of inland waterways in the transportation of non-perishable commodities that do not require rapid moving has not been brought out with sufficient force to demonstrate how a preventative against excessive railroad rates can be thereby assured. Here the need of regulation becomes apparent at once. The last two chapters are devoted to a study of Government regulation, the subject being treated both as applying to American conditions and from the standpoint of the general principles by which it is affected. The author lucidly presents the main facts involved in this complex problem. His views on the personnel of State railroad Commissions are sound. Neither the cowboy who has "killed his man" nor the brakeman who has lost both legs in a railroad accident are persons to whom the solving of regulation problems can be satisfactorily entrusted.

LEON DOMINIAN.

EDUCATIONAL GEOGRAPHY

Der wetterkundliche Unterricht: Ein systematischer Lehrgang. Von Dr. Franz Linke in Gemeinschaft mit Jacob Clössner. 2. und 3. durchgesehene Auflage. viii and 177 pp. Ills. Franz Auffahrt, Frankfurt am Main, 1912. Mk. 3.50. 9 x 5½.

Since the publication, in 1909, of Ward's "Practical Exercises in Elementary Meteorology," we have had no book devoted entirely to the subject of the meteorological work which may be undertaken during the school years. With

XUM

a keen appreciation of the value of elementary meteorology as a disciplinary study, and of the importance of the subject in everyday life, the authors of the present volume have given us a well-arranged outline of the work which may be undertaken during nine years of the school course. From the simplest weather observations the scholar is led on through the graphic presentation of his data to the study of the daily weather maps—a logical order which, under the guidance of a good teacher, cannot fail to interest the children. The book is, of course, especially adapted for use in German, but the general scheme of work might be followed anywhere with distinct advantage. R. DEC. WARD.

Compendium of Mathematical, Physical and Political Geography. [In Yiddish.] By Alexander Harkavy. Vol. I, xv and 358 pp. Vol. II, xii and 414 pp. Ills., index. Hebrew Publishing Co., New York, 1911. $1. 8 x 5½.

This elementary geographical work is in many respects exceptional, even unique. It is written not only in a very peculiar language, a Judeo-German dialect, commonly called Yiddish (also Jargon), and spoken at present by about three-fourths of the Jewish people, but also with quite a different object than the usual elementary geographies in any other living language. The author had in view grown-up people, fathers and mothers, but not school children. In his preface he calls attention to the exceptional condition of the Yiddish literature, that "while it is relatively rich in compilations on speculative subjects, on history, political economy, philosophy, etc., it is very poor in works on elementary knowledge, which is the foundation of education and a necessary introduction to such high subjects." Then he adds that there is an especial lack in writings on elementary geographical subjects in Yiddish.

This is remarkable indeed. It seems incredible to a stranger, not only to a Gentile, but even to a Jew who is not familiar with the Yiddish literature. Mr. Harkavy, who is well known among Jews as an author of educational books, especially of dictionaries, gives one, the most important explanation of this striking fact, when he says in his preface that "in compiling this geography the author took into consideration that the persons who would make use of it will have to be their own teachers, and he, therefore, arranged it on broader lines than geographies for school, adapted specially for such of our people as did not receive the ordinary elementary education in public schools."

At any rate, credit must be given to Mr. Harkavy for his efforts to compile not only an elementary geography for grown-up people, but to use such popular expressions as to be understood by persons who have no more knowledge of geography than their children, when they begin to learn in schools this most necessary and useful subject. Let the reader imagine a geography, written for such English-speaking folk as have never attended public school, never been taught elementary geography, history, grammar, or even arithmetic, and he will understand what difficulties Mr. Harkavy had to overcome in his work. Very often he has had to coin new terms, to create new expressions. Mr. Harkavy made use of quite a number of geographies in the different languages which he masters. He had in view mostly Yiddish readers in United States, Canada and English-speaking countries generally, as the English words in parentheses show. Of the two volumes the first contains the mathematical, cosmographic and physical parts. The second volume is devoted to political geography, the United States occupying the first and most prominent space. It is a very useful book for Yiddish readers. JACOB ROMBRO.

HISTORICAL GEOGRAPHY

A Commentary on Herodotus. With Introduction and Appendices by W. W. How and J. Wells. Vol. I (Books I–IV), xii and 446 pp.; maps. Vol. II (Books V–IX), viii and 423 pp.; maps. Clarendon Press, Oxford, 1912. $2.50 for each vol. 7½ x 5½ each.

In connection with the academic end to which the volumes of this commentary are addressed the authorities upon classical studies will pass judgment

upon the material here richly provided. But is the academic the better attitude in which to present Herodotus to the young men of the universities? Wiser by centuries than his critics, Herodotus traveled and recorded. Long disbelieved, he is coming into his own; modern exploration is confirming the essentials of his record. We should like to have a commentary on Herodotus which assumes the Greek grammar as otherwise acquired, which illuminates his statements with the wealth of modern discovery. Evidently, Oxonian scholarship has not yet left its schools and come up into the clearer air, for in these two volumes the specific treatise upon Herodotus as the first of the great world geographers would fill less than four pages of this *Bulletin*. The specific detail is equally jejune. We note, just by way of a single example, the treatment of the passage in the first book where Herodotus speaks of the tangle of Euphratean canals at Ardericca where the waterway is so tortuous that the voyager passes the same village three times in three days. The commentators, like most of their academic tribe, adopt the explanation that "he accepted this statement from some waggish fellow-traveler, who hoaxed him." Fortunately, they have subjoined Matzat's diagram showing how this might be possible without recourse to the ancient theory that Herodotus was easily gulled. WILLIAM CHURCHILL.

Korte Historiael ende Journaels aenteyckeninge van verscheyden Voyagiens in de vier deelen des wereldts-Ronde, als Europa, Africa, Asia, ende Amerika. gedaen door d. David Pietersz. de Vries. Uitgegeven door Dr. H. T. Colenbrander. Maps, ills., index. Linschoten Vereeniging, 1911. Martinus Nijhoff, The Hague, 1911. 10 gulden. 10 x 6½.

In this volume the Linschoten Vereeniging (Association of Linschoten), a scientific society which, like the famous English Hakluyt Society, is publishing in the original tongue, hitherto unpublished and rare descriptions of Netherlandish sea and land voyages as also contributions to geography and ethnology, has brought into the market a book which must be considered one of the most valuable contributions not only to historical geography as such, but to the history of early America in particular. The book deals with the diary of David Pietersz. de Vries (born about 1592 or 1593), "artillery master," seaman and merchant-adventurer, who during the years 1618 to 1644 made seven voyages to New Netherland and Guiana.

Of the work here reproduced, only one copy is known to exist in Europe, that in the Museum Meerman at the Hague, all others that have occasionally come to hand having been eagerly purchased by lovers of rare books in the United States. In this country, attention to De Vries' voyages was first directed in 1841 through the publication of some passages from it in the "Collections of the New York Historical Society." Somewhat later, in 1853, Brodhead mentioned de Vries' voyages in the first volume of his "History of the State of New York," and in the same year H. C. Murphy issued part of the diary in "Voyages from Holland to America 1632 to 1644"; finally, J. Franklin Jameson, in "Narratives of New Netherland" (New York, 1909) makes ample use of the great Hollander.

For the history of the early settlements in America his fifth, sixth and seventh voyages are of greatest interest, because they lead us to the time when the State of Delaware was founded (the Delaware river bore at that time the name "Zuid-Rivier," while the Connecticut was called "Versche Rivier"); and to the times of the conflicts of the settlers with the natives. It is of interest to read what de Vries has to say about the Indian massacre of February, 1643. In comparing the English colonists of Puritan stock with the Dutch, de Vries declares the former to be far better material than his own countrymen, because the latter were too much addicted to intoxicants.

The limited length of this review forbids me to enter into details of de Vries' narratives. It must be read from cover to cover in order to be appreciated. The book has a number of plates, illustrating scenery, customs and manners of the people he saw and a reproduction of Adriaan van der Donck's map of New Netherland, 1656. A few poems by friends of de Vries, preceding the text of the diary, bear witness that he was considered among his own people one of their worthiest and most respected members. CHARLES L. HENNING.

XUM

PHYSICAL GEOGRAPHY

Kaysers Physik des Meeres. Zweite Auflage, neubearbeitet von Dr. Carl Forch. Mit einem Beitrag über die leuchtenden Meeresorganismen von Prof. Dr. Paul Zenetti. viii and 384. Ills., index. Ferdinand Schöningh. Paderborn, 1911. 6 mks. 48 pfg. 9 x 6.

The first edition of this popular, scientific book on oceanic physiography appeared some thirty years ago, when oceanography was still in its infancy. Since that time a number of most important voyages and exploring expeditions have occurred above all the voyages of H. M. S. *Challenger,* the U. S. Coast and Geodetic Survey steamer *Blake,* the Plankton Expedition and others, which have contributed largely to our knowledge of the deep sea and its life.

Kayser's book is written in popular style and will be useful to all who are interested in the subject, but who have not access to the standard work by Otto Krümmel, "Handbuch der Ozeanographie," the second edition of which has appeared in two volumes (Stuttgart, J. Engelhorn, 1911). The chapters deal with the distribution of land and sea in the present geological epoch as well as in previous periods of the history of our globe, with the chemical and physical properties of sea-water, with tides and currents, and with the description of the apparatus used in deep-sea exploration. The chapter on the phosphorescence of the sea by Zenetti will doubtless help to elucidate that great phenomenon. Forch urges that what is most needed at the present time is systematic exploration of the great oceans in our latitudes; that is to say, of the North Atlantic, from the equator to 60° lat. N. In doing so there would be gained better results than in exploring the Arctic or Antarctic. CHARLES L. HENNING.

La Face de la Terre (Das Antlitz der Erde). Par Ed. Suess. Traduit sous la direction de Emm. de Margerie. Tome 3 (2e partie). pp. 531–956. Maps, ills. Armand Colin, Paris, 1911. Fr. 12. 10 x 6½.

The penultimate volume of the French translation of this synthetic masterpiece bespeaks anew Mr. de Margerie's thorough communion with the scientific spirit that has presided over Suess's comprehensive survey of the surface of our planet. The translator and his staff of collaborators have not confined themselves to the mere transposition of the original. They have added to the value of the work by widening its field of reference. The copious foot-notes appended on their own initiative enhance in no slight degree the accuracy of the author's well-grounded insight into the general conformation of the earth while serving to bring the treatise up to date.

This new material often consists of condensed comment suggested by recent available results of international research. It is enclosed in square brackets to distinguish it from the foot-notes accompanying the original. In particular, the detail work of French scientists in Africa, that of Americans in America, thus referred to, throws much brighter light on our knowledge of the American and African Altaides. The correlation of the Variscan-Armorican arc with the paleozoic field of north-eastern North America is also presented with considerable conclusive evidence.

Similar contributions to the chapter on the Western Alps afford a clearer outlook on their tectonic character. In some cases the interpreter has succeeded in defining with greater accuracy the geological regions which the author has abstained from delimitating, as in the case of the Flysch zone, lying east of the Vesubian spur, in the vicinity of the Franco-Italian frontier. The whole tone of the work is permeated by a strong literary flavor which is both in keeping with the spirit of the subject and the best traditions of French scientific writings.

LEON DOMINIAN.

Studies in Terrestrial Magnetism. By Charles Chree, F.R.S., Superintendent of Kew Observatory. London, Macmillan & Co., Ltd., 1912. 8vo. Pp. xii and 206. Price $1.60 net.

Dr. Chree is well known as an active original investigator of the phenomena of terrestrial magnetism, and is admirably qualified to prepare the text on this

subject for *Macmillan's Science Monographs.* The author distinctly says that his volume is not intended to be a text-book, nor is it intended to summarize existing knowledge in the branches of terrestrial magnetism with which it deals. Dr. Chree's object is to give an account of his own original work, "referring to the work of others only so far as is necessary for intelligibility." Facts, or, as the author frankly states, "supposed facts," and not theories as to the origin of magnetic changes are dealt with. In the opinion of the author, theorizing is less likely to be of advantage in the present stage of study than is the extension of positive knowledge. All this is very refreshing and delightfully frank as a statement of Dr. Chree's point of view in writing the volume. The book, while thus somewhat limited in the field which it is designed to cover, will, we feel sure, prove very welcome to all who are interested in this important subject.

R. DEC. WARD.

GENERAL

Distribution and Origin of Life in America. By Robert Francis Scharff. xvi and 497 pp. Maps, index. The Macmillan Co., New York, 1912. $3. 9 x 6.

Dr. Scharff has failed to make interesting this extremely valuable volume upon a subject which in itself must prove of the utmost interest to geographers. In such work as this we find our field widened, the acre of to-day, no matter the method of earth-science whereby we study it, becomes a more thrilling space when we have unfolded from the mere acre the history of the paleoarchaic continent of which it may be but the sole survival. The author has already performed similar service for the Eurasian land-mass. In this volume he restores not one but several continental arrangements of land-mass of which the survival may through his careful method of research be detected in one or the other of the Americas of our present knowledge. It is not easy to follow the argument; the mass of detail is very great, its magnitude is a triumph of research, but in this work its treatment is so minutely in detail that it calls for very close observation to dig out the broad conclusions of the study. It was probably necessary to provide for all such criticism of the argument as might be foreseen by the author. It is clear that he felt an obligation to dissect the bearing of each of the data amounting to thousands which he has here assembled. Working geographers would find richer pleasure in this highly important book if its geographical results had been presented with somewhat more commanding prominence and the minute details of zoological proof had less dominated the foreground. The work is truly encyclopedic as a storehouse of the facts of the zoogeography of the Americas and we look to see its conclusions held fundamental in future treatises upon the ancient geography of the Western World.

WILLIAM CHURCHILL.

Vergleichende Mond- und Erdkunde. Von Dr. Siegmund Günther. Heft 37. Die Wissenschaft, Sammlung naturwiss. und math. Monographen. xi and 193. Ills., index. Friedr. Vieweg & Sohn, Braunschweig, 1911. 5 mks. 8½ x 5½.

Whenever Günther takes up his pen to write about a subject in geophysics or geography, one may be sure to get the very best. In this volume, being a comparative history of moon and earth, he analyzes, in the first chapter, the various views of classic antiquity in regard to their mutual relationship, from the time of Anaxagoras (500-428 B. C.), who was among the first to pronounce a material unity of the earth, sun, moon and all the other heavenly bodies, down to the present day. The invention of the telescope and spectroscope has made it now an undisputed certainty that the earth and her satellite are of common origin, having the same composition and features. To Galileo, "who has brought the stars nearer to us," and to Kepler, whose posthumous work "Dream of the Moon" (1634) another Günther (L. Günther, Kepler's "Traum vom Monde," 1898) has made popular, the author devotes a special chapter. He calls these two heroes of science by right "the founders of a scientific topography of the moon and the founders of comparative selenography and geography." During

the seventeenth and eighteenth centuries, the physical unity of both earth and moon became still more apparent, until in the nineteenth and twentieth centuries, when photography and spectroscopy were placed at the service of astronomy, the question of unity was finally settled as also the fact that the formation of our satellite is due to the activity of cosmic-volcanic energy.

A somewhat fantastic theory, introduced into science about thirty years ago, was to the effect, that all the uneven parts of the moon's surface came into existence through the falling of meteors upon the pliable mass of that body, by means of which action the walls and craters of the moon were formed. This theory has been styled "a bombardment of the moon by meteorites." It has found an advocate in our friend Grove K. Gilbert (The Moon's face; a study of the origin of its features. *Bull. of the Philos. Soc. of Washington*, vol. 12, p. 241 ff). Gilbert discovered a certain agreement with the theory in "Coon Butte," Ariz., which, in his opinion, resembles the moon's craters. Although Gilbert approaches the subject from a more careful standpoint than the anonymous authors of the theory, Günther does not take a positive position concerning it. He says: "The meteoric theory of the moon marks a stage of transition in our knowledge, which, even he who thinks differently, cannot refuse to recognize, because much learning and skill have been devoted to it and have evidently opened new views on a problem in astrophysics, that had arrived at a certain point of stability." Günther concludes his excellent book with the statement that the norms which have been recognized as fully applicable for the volcanic and tectonic phenomena of the earth, can be transferred with certain caution also to our neighboring satellite. CHARLES L. HENNING.

OTHER BOOKS RECEIVED

These notes do not preclude more extended reference later

NORTH AMERICA

THE GEORGIA ANNUAL FOR 1912. A Compendium of Useful Information about Georgia. 252 pp. A. B. Caldwell, Atlanta, Ga., 1912. $3. 9½ x 6½.

STAGE-COACH AND TAVERN DAYS. By Alice Morse Earle. xvi and 449 pp. Ills., index. Macmillan Co., New York, 1912. $1.50. 7½ x 5½. [The carefully prepared story of an important phase of life in the United States before the railroad era; with many incidents, anecdotes and illustrations.]

AFRICA

ANNUAL REPORTS OF THE COLONY OF SOUTHERN NIGERIA FOR THE YEAR 1910. 689, 56, 44, and 26 pp. Maps. Government Printer, Lagos, 1912. 13½ x 8. [The value of the purely commercial imports and exports for Northern and Southern Nigeria together, for 1910 was $49,175,000; for 1906, $27,435,000. These figures do not include government importations, or specie.]

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JOHN BOYES, KING OF THE WA-KIKUYU. A True Story of Travel and Adventure in Africa. Written by Himself. Edited by C. W. L. Bulpett. xv and 320 pp. Map, ills., index. Methuen & Co., London, 1911. 12s. 6d. 9 x 5½. [The adventures of Mr. Boyes were quite out of the common. At one time he wielded much influence over the Wa-Kikuyu tribe, living among the foothills of Mt. Kenia. When the British formally brought this region under their domain they arrested the self-anointed potentate and tried him for various crimes and misdemeanors but he was acquitted on all charges.]

SUDAN ALMANAC, 1912. Compiled in the Intelligence Department, Cairo. Astronomical Calculations made in the Egyptian Survey Department, Cairo. 102 pp. Map, diagram, ills. 1s. 5½ x 4. [A valuable compilation of information on the Anglo-Egyptian Sudan.]

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NEW MAPS

EDITED BY THE ASSISTANT EDITOR

System Followed in Listing Maps.

Title. As on original, if possible. If lacking or incomplete, necessary matter enclosed in brackets.

Scale. Natural (unless otherwise on original). If no scale on original, approximate scale enclosed in brackets.

Coordinates. Approximate limiting coordinates of map given except when region explicitly defined by title. Where map-net lacking, coordinates, if possible of determination, given in brackets. All meridians referred to Greenwich. If map not oriented N., orientation given.

Colors. Number of tints of separate symbols, not number of color printings given. Black or basal color not considered a color.

Source. If map separately published, name of institution issuing it, place and date given. If a supplement, title of paper or book, author, periodical, volume, number, year and pages given.

Comment. Descriptive and critical. In brackets.

Regional Classification. Major political divisions the unit, as a rule, except for United States and Canada. Boundaries of continents according to Siever's *Länderkunde*, Kleine Ausgabe.

NORTH AMERICA

CANADA

ALBERTA. Cereal Map of Alberta Showing Acreage under Crop in Each Township in Wheat, Oats, Barley and Flax. Cereal information prepared in the Railway Lands Branch . . . from data supplied by the Provincial Govern-

ment. Second edition 1910. 1:792,000. 55⅔° - 49° N.; 117½° - 109½° W. 7 colors. Dept. of the Interior (Ottawa), 1910.

[Circles, differently colored for each cereal, show acreage of each township.]

SOUTH AMERICA

BRAZIL. Iriri-Curuá-Jamanchim (Xingú- und Tapajozgebiet). Nach der Routenaufnahme 1909 von Fräulein Dr. E. Snethlage bearbeitet und gezeichnet von Dr. Max Mayr, München, 1911. 1:1,000,000. 3° - 7° S.; 56°0′ - 52°34′ W. 1 color. With inset: Übersicht der kartographischen Veränderungen infolge von Frl. Dr. Snethlages Reise, auf Stielers Handatlas Nr. 96. 1:7,500,000. 1 color, Taf. 41, "Die Routenaufnahmen von Dr. A. Snethlage vom Xingú zum Tapajoz" by M. Mayr, *Pet. Mitt.*, Vol. 48, I, April, 1912, pp. 209-213.

[Valuable survey of two hitherto unexplored rivers.]

AFRICA

CAPE OF GOOD HOPE. Geological Map of the Province of the Cape of Good Hope. 1:238,000. (1) Sheet 19 (Nieuwerust). Geology by A. W. Rogers, 1912 (described in the Annual Reports of the Geol. Comm. for 1904 and 1911). (2) Sheet 26 (Dordrecht-Barkly East). Geology by A. L. Du Toit, 1912 (described in the Annual Reports of the Geol. Comm. for 1903, 1904, 1905, 1910, 1911). Geological Commission of the Cape of Good Hope, Cape Town, 1912.

[For previous maps of this series see under "Cape of Good Hope," *Bull.*, Vol. 43, 1911, p. 472.]

TRANSVAAL. [Geologic map of the Transvaal:] Sheet 9. Marico (Portions of Marico and Rustenburg Districts). Surveyed in 1908-1910. 1:149,000. 25°0′ - 25°30′ S.; 25°30′ - 26°30′ E. 16 colors. Accompanied by "The Geology of the Country Lying Northwards from Zeerust: An Explanation of Sheet 9 (Marico)" by W. A. Humphrey, Geol. Survey [of Transvaal], Mines Dept., Union of South Africa, Pretoria, 1911.

[Previous sheets of this series, with scale incorrectly given, listed under "South Africa" in *Bull.*, Vol. 43, 1911, pp. 159-160.]

TRIPOLITANIA. Le Nuove Provincie Italiane Tripolitania e Cirenaica. (Costruita e disegnata da) A(chille) Dardano. 1:2,500,000. 38⅔° - 22⅓° N.; 7½° - 27° E. 13 colors. With three insets: (1) Paesi del Mediterraneo. 1:10,000,000. 12 colors. (2) Tripolitania Settentrionale. 1:1,000,000. 33°16′ - 31°0′ N.; 11°25′ - 16°2′ E. 5 colors. (3) Cirenaica. 1:1,000,000. 33° - 31° N.; 19°40′ - 24°10′ E. 4 colors. Istituto Geografico de Agostini, Novara. In pocket: price L. 2.00.

[Excellent "semi-mural" map bringing out well the salient features of the geography of Tripolitania. On main map and on insets (2) and (3) areas under cultivation and oases in green, separate symbols for steppe, sand desert, pebble desert (*serîr*) and rock desert (*hammáda*). Caravan routes in red, antique names in block letters, tribal names in red.]

ASIA

CHINA. Das Hinterland von Tschifu [Chefoo] (Nordseite der Schantung-Halbinsel). Nach Originalaufnahmen von Walter Anz. 1:300,000. 37°53′ - 36°50′ N.; 119°40′ - 121°39′ E. 4 colors. Taf. 494, "Das Hinterland von Tschifu und die geplante Eisenbahn Tschifu-Weihsien" (last part) by W. Anz, *Pet. Mitt.*, Vol. 58, I, May, 1912, pp. 303-304.

[Valuable map based on original surveys supplementing v. Richthofen's work and correcting the map of "Tchili und Schantung," 1:200,000, published by the Kartogr. Abteilung der kgl. Preussischen Landesaufnahme.]

INDIA. [Eighteen sheets of the] Standard Map of India. 1:63,360. 3-5 colors. Survey of India. Price of each sheet 1 rupee. (1) Sheet No. 38 P:15. Parts of Districts Miánwáli & Sháhpur, Punjab. 1911. 32°30′ - 32°15′ N.; 71°45′ - 72°0′ E. (2) 44 A:3. District Jhang, Punjab. 1911. 31°30′ - 31°15′ N.; 72°0′ - 72°15′ E. (3) 44 A:14. Districts Jhang & Lyallpur. 1911. 31°45′ - 31°30′ N.; 72°45′ - 73°0′ E. (4) 49 M:5. Part of District Malabar, Madras.

XUM

1909. 12°0′ - 11°45′ N.; 75°15′ - 75°30′ E. (5) 49 M:9. Part of District Malabar and of Mahé, Madras. 1909. 12°0′ - 11°45′ N.; 75°30′ - 75°45′ E. (6) 49 M:10. Part of District Malabar and of Mahé, Madras. 1910. 11°45′ - 11°30′ N.; 75°30′ - 75°45′ E. (7) 49 M:11. Part of District Malabar, Madras. 1909. 11°30′ - 11°15′ N.; 75°30′ - 75°45′ E. (8) 49 M:13. Part of Coorg and of District Malabar, Madras & Coorg. 1910. 12°0′ - 11°45′ N.; 75°45′ - 76°0′ E. (9) 49 M:14. Part of District Malabar, Madras. 1910. 11°45′ - 11°30′ N.; 75°45′ - 76°0′ E. (10) 49 M:15. Part of District Malabar, Madras. 1909. 11°30′ - 11°15′ N.; 75°45′ - 76°0′ E. (11) 49 M:16. Part of District Malabar, Madras. 1910. 11°15′ - 11°0′ N.; 75°45′ - 76°0′ E. (12) 45 N:13. Part of District Malabar, Madras. 1910. 11°0′ - 10°45′ N.; 75°45′ - 76°0′ E. (13) 49 N:14. Part of District Malabar, Madras. 1910. 10°45′ - 10°30′ N.; 75°45′ - 76°0′ E. (14) 58 A:3. Parts of Districts Malabar & Nilgiri, Madras. 1910. 11°30′ - 11°15′ N.; 76°0′ - 76°15′ E. (15) 58 A:4. Part of District Malabar, Madras. 1910. 11°15′ - 11°0′ N.; 76°0′ - 76°15′ E. (16) 58 A:7. Parts of Districts Malabar and Nilgiri, Madras. 1910. 11°30′ - 11°15′ N.; 76°15′ - 76°30′ E. (17) 58 A:8. Parts of Districts Malabar and Nilgiris, Madras. 1910. 11°15′ - 11°0′ N.; 76°15′ - 76°30′ E. (18) 64 A:15. District Mandlā & Rewah State. 1911. 23°30′ - 23°15′ N.; 80°45′ - 81°0′ E.

[These sheets belong to a new edition of the Standard Map of India, which was formerly published in black, or in black and brown only, in sheets measuring 30′ of longitude by 15′ of latitude. On the present sheets relief is in brown contours, forest and jungle in dark or pale green according to density, perennial waters and canal systems in blue, and cities, village sites and roads in red. Each sheet forms one-sixteenth part of a so-called degree sheet, in the same way as a degree sheet forms one-sixteenth part of a sheet of the Map of India and Adjacent Countries, 1:1,000,000, five sheets of which were listed in the June *Bull.*, p. 478. For by far the greater part of India the sheets in the old form (the dates of survey vary from 1850 to 1904) are still the only one-inch-to-the-mile maps available, and this will be the case for many years to come.]

JAPAN. [Three sheets of the topographic map of Japan.] 1:200,000. 2 colors. (1) Hiroshima (Zone 7. Col. V). 34°30′ - 34°0′ N.; 132° - 133° E. (2) Ichinohe (Zone 19. Col. XIV). 40°30′ - 40°0′ N.; 141° - 142° E. (3) Shichinohe. 41°0′ - 40°30′ N.; 141° - 142° E. Imperial Geological Survey of Japan, Tokyo, 1911.

[Relief in gray contours, interval 40 meters; drainage in light blue. For previous sheets see *Bull.*, Vol. 40, 1908, p. 697 and Vol. 42, 1910, p. 800.]

JAPAN. Geological Map [of Japan]. Division II. Original survey published in 1887. Revised [edition]. Published in 1911. 1:400,000. 38°30′ - 34°25′ N.; 137°55′ - 141°15′ E. 18 colors. With two insets: (1) Izu Shichito. 1:1,600,000. 35°0′ - 32°10′ N.; 139°0′ - 140°10′ E. 1 color. (2) Ogasawara Jima. 1:1,600,000. 28°10′ - 26°30′ N.; 141°50′ - 142°35′ E. 1 color. In 6 sheets. Imperial Geological Survey of Japan, Tokyo, 1911.

[Valuable geological map of central Japan, superimposed on topographic map with relief in contours. For geologic maps of the whole of Japan, see *Bull.*, Vol. 43, 1911, p. 709.]

JAPAN. Mineral Distribution of Japanese Empire. 1:2,000,000. 48° - 29° N.; 121° - 149° E. 35 colors. With four insets: (1) [Taiwan (Formosa)]. 1:4,000,000. (2) [Southern Manchuria]. 1:4,000,000. 44° - 38⅓° N.; 120⅔° - 127° E. 5 colors. (3) General Map of Japanese Empire. 1:12,000,000. In 4 sheets. Accompanied by a leaflet entitled "Distribution of Minerals in the Japanese Empire and the Corean Peninsula," 4 pp. Imperial Geological Survey of Japan, Tokyo, Sept., 1911.

[Quantity of mineral production indicated symbolically by rectangles in color referring to a table printed on the map. Geological boundaries given in regions of mineralogic interest.]

AUSTRALASIA AND OCEANIA

SAMOAN ISLANDS. Die Nordamerikanischen Samoa-Inseln. Nach Aufnahmen von Dr. Kurt Wegener. (a) Manua [Group]. 1:100,000. 14°10′ - 14°17′ S.;

169°43′ - 169°27′ W. 1 color. (b) Tutuila. 1:100,000. 14°15′ - 14°24′ S.; 170°53′ - 170°31′ W. 1 color. Taf. 40, "Die nordamerikanischen Samoainselgruppen Tutuila und Manua" by K. Wegener, *Pet. Mitt.*, Vol. 58, I, April, 1912, pp. 208-209.

[Both maps reproduced in July *Bull.* with detailed comment, pp. 506-512.]

EUROPE

AUSTRIA. Gesamtplan von Wien. 1:25,000. 13 colors. With one inset: I. Bezirk. Innere Stadt. 1:12,500. 8 colors. G. Freytag & Berndt, Vienna.

[Excellent map of Vienna and environs showing built-up areas (public buildings differentiated), cemeteries, parks, meadow land, vineyards and forest, as well as the administrative divisions of the city and its transportation lines.]

AUSTRIA. Plan der Grossgemeinde Wien. Bezirke I-XXI. Ausgabe 1911. 1:25,000. 12 colors. Artaria & Co., Vienna, 1911.

[A map similar in scope to that listed above, although not quite as good in execution.]

AUSTRIA. (a) Karte der Raxalpe. Für Touristen bearbeitet von Gustav Freytag. Terrain auf Grundlage der Originalaufnahme des k. u. k. Militärgeographischen Institutes von Hans Rohn. 1:25,000. [47°46′ - 47°38′ N.; 15°38′ - 15°50′ E.] 5 colors. G. Freytag & Berndt, Vienna.

(b) Karte der Lechtaler-Alpen. Aufnahme von L. Aegerter mit Benützung der k. k. Kataster Triangulation. 1:25,000. 47°16.2′ - 47°7.6′ N.; 10°18.0′ - 10°34.7′ E. 3 colors. Published by the Deutscher u. Oesterreichischer Alpen Verein, 1911; engraved by G. Freytag & Berndt, Vienna.

[Two excellent maps in the style of the maps of portions of the Austrian Alps published by the German and Austrian Alpine Club and similar in execution to the 1:25,000 and 1:50,000 sheets of Switzerland. Bare rock in black, contours in brown (on glaciers in blue) and drainage in blue. Contour interval on map (a) 10 meters, on map (b) 20 meters.]

IRELAND. Bartholomew's "Quarter Inch to Mile" Map of Ireland. Sheet 2: Belfast & N. E. Counties. 1:253,440. 55°23′ - 53°51′ N.; 7°15′ - 6°24′ W. 9 colors. With inset map of Belfast. 1:20,000. The Edinburgh Geographical Institute, Edinburgh.

[Previous sheets of this excellent series of maps with hypsometric coloring listed, with comment, under "England," *Bull.*, Vol. 43, 1911, p. 958 and under "Scotland," *Bull.*, Vol. 44, 1912, p. 319.]

ITALY. (a) Carta Corografia della Provincia di Catanzaro. 1:250,000. 39°27′ - 38°25′ N.; 15°48′ - 17°15′ E. 5 colors. Price L. 1.00. (b) Carta Corografica della Provincia di Reggio Calabria. 1:250,000. 38°40′ - 37°51′ N.; 15°32′ - 16°39′ E. 5 colors. Price L. 0.75. Istituto Geografico de Agostini, Novara.

[Extracts from the map of Italy published by the Italian Touring Club. Fully equal to the best German maps, especially in the treatment of relief. *Routes carossables* are shown in red, others, including mule paths, in black.]

WESTERN EUROPE. Karte der Häufigkeit der Schwankungen um den Frostpunkt [in western Europe]. Gezeichnet von Paul Schröder. 1:15,000,000. 72° - 40° N.; 15° W.-37° E. 5 colors. Accompanies, as Taf. 47, article with same title by same author, *Pet. Mitt.*, Vol. 58, I, May, 1912, pp. 266-267.

WORLD AND LARGER PARTS

NORTHEASTERN AFRICA-ARABIA. Mar Rosso e Possedimenti Italiani in Africa. Mercator's Projection: mean meridional scale 1:4,500,000. 32°15′ - 12°0′ N.; 29°45′ - 46°40′ E. 6 colors. With two insets: (1) Possedimenti Italiani in Africa. 1:24,000,000. (2) Massaua e dintorni. 1:75,000. 15°36′ N. and 39°26′ E. 4 colors. Istituto Geografico de Agostini, Novara.

[Shows railroads, telegraph lines, cables, lighthouse and wireless telegraph stations, but no relief.]

XUM

WORLD. Die Flächengliederung der Erdteile. Entworfen von Dr. P. Seyferth. 1:60,000,000. 2 colors. Taf. 44, "Die Gliederung der Erdteile" by P. Seyferth, *Pet. Mitt.*, Vol. 58, I, May, 1912, pp. 249-253.

[Outlines of the five continents (Eurasia counted as one) to illustrate a new method of determining the ratio of the trunks of the continents to their members.]

POLAR

ARCTIC. Die für 1912-14 geplanten Nordpolarforschungen. 1:30,000,000. Polar cap within 50° N. 3 colors. Taf. 47, "Die geplante dänische Expedition nach Königin-Luise-Land und quer über das Inlandeis Nordgrönlands 1912/13" by J. P. Kort, *Pet. Mitt.*, Vol. 58, I, May, 1912, pp. 265-266.

EDUCATIONAL

BRITISH EMPIRE. [Four school wall maps with physical coloring entitled:] (a) Bacon's Excelsior Map of Ireland with the Adjacent Coasts of Great Britain by G. W. Bacon, F.R.G.S. 1:760,000. 55°30′ - 51°10′ N.; 12°0′ - 2°40′ W. 10 colors.

(b) Bacon's Excelsior Map of the Dominion of Canada by G. W. Bacon, F.R.G.S. [1:5,700,000]. 79° - 40° N.; 170° - 40° W. 11 colors. With one inset: Newfoundland. 1:6,500,000. 7 colors.

(c) Bacon's Excelsior Map of Australasia. (Contour Edition). [Mercator's projection: equatorial scale 1:5,800,000]. 2° N.-50° S.; 101° - 180° E. 11 colors. With inset map of England and Wales on same scale for comparison. In 4 sheets.

(d) Bacon's Excelsior Map of New Zealand (Contour Edition). 1:1,000,000. 34½° - 47° S.; 166¼° - 179¼° E. 13 colors. With three insets: (1) Chatham Islands. 1:1,000,000. 44° S. and 176½° W. (2) Oceania Showing Its Relation to the Continent of Asia. [Mercator's projection: equatorial scale 1:13,500,000]. 42° N. - 52° S.; 79° E. - 178° W. 4 colors. (3) Map Showing the Routes Round the World. [Mercator's projection: equatorial scale 1:41,000,000]. 3 colors.

In series: Bacon's Excelsior School Wall Maps, Orographical Contour Coloring. G. W. Bacon and Co., Ltd., London. Price: maps of Ireland and Canada, 7s 6d each, of Australasia and of New Zealand, 16s each.

[A very fair series of school wall maps with physical coloring illustrative of the growing influence upon educational publishers of the higher standards in geographical teaching in Great Britain.

The color scheme is, on the whole, well-chosen, although the use of green on maps (c) and (d) for the lowest depths does not seem felicitous. The nomenclature, however, is not critical, being merely an enlargement of the names that would appear on the same maps if drawn on a smaller scale and intended for close consultation.

Both islands of New Zealand on one map have heretofore not been available in this form.]

WORLD, ETC. Oxford Outline Maps: Edited by Prof. A. J. Herbertson, M.A. Drawn by B. V. Darbishire. (1) The World (Western and Eastern Hemispheres). Lambert's Azimuthal Equal Area Net. 1:100,000,000. (2) The World (Polar Hemispheres). Lambert's Azimuthal Equal Area Net. 1:100,000,000. (3) The World: Mollweide's Elliptical Equal Area Net. 1:100,000,000. (4) [Western Europe:] Outlines for Weather Map. [1:15,000,000]. (5) [Great Britain:] Outlines for Climate Map. 1:5,000,000. (6) Contour Map Exercise. Devised by Dr. H. R. Mill. [1:316,800]. Clarendon Press, Oxford. Price 1d each.

[An excellent series of outline maps exhibiting the soundness in educational method lacking in the similar American series reviewed in the *Bull.*, Vol. 43, 1911, pp. 712-713. Map (6) is an ingenious diagram showing a great number of dots, with the elevation or depth of the points they represent, from which a contour map, with altitude tints, of the region is to be reconstructed and two sections to be drawn along lines indicated. From this map the physical features of the region are to be described and the probable geological structure, latitude, climate and products to be deduced. Other maps of this series are in preparation.]

XUM